AD A133 959

1

INSTALLATION RESTORATION PROGRAM

PHASE I.- RECORDS SEARCH

HOMESTEAD AFB, FLORIDA

PREPARED FOR

UNITED STATES AIR FORCE
TACTICAL AIR COMMAND
Directorate of Engineering
and
Environmental Planning
Langley AFB, Virginia

AUGUST 1983

ES ENGINEERING-SCIENCE

NOTICE

This report has been prepared for the United States Air Force by Engineering-Science for the purpose of aiding in the Air Force Installation Restoration Program. It is not an endorsement of any product. The views expressed herein are those of the contractor and do not necessarily reflect the official views of the publishing agency, the United States Air Force, nor the Department of Defense.

Copies of the report may be purchased from:

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Federal Government agencies and their contractors registered with Defense Technical Information Center should direct requests for copies of this report to:

Defense Technical Information Center
Cameron Station
Alexandria, Virginia 22314

INSTALLATION RESTORATION PROGRAM
PHASE I-RECORDS SEARCH
HOMESTEAD AFB, FLORIDA

Prepared For

UNITED STATES AIR FORCE
TACTICAL AIR COMMAND
Directorate of Engineering and Environmental Planning
Langley AFB, Virginia

AUGUST 1983

Prepared By

ENGINEERING-SCIENCE
57 Executive Park South, Suite 590
Atlanta, Georgia 30329

NOTICE

ES ENGINEERING-SCIENCE

57 EXECUTIVE PARK SOUTH, N.E., SUITE 590 • ATLANTA, GEORGIA 30329 • 404/325-0770

CABLE ADDRESS ENGINSCI
TELEX 54-2882

August 12, 1983

Mr. Gil Burnet
TAC/DEEV
Langley AFB, VA 23665

Dear Mr. Burnet:

Enclosed is the Engineering-Science, Inc. (ES) report entitled "Installation Restoration Program, Phase I - Records Search, Homestead AFB, Florida." This report has been prepared in accordance with Air Force Contract Number F33615-80-D-4001-~~0039~~.

Presented in this report are introductory background information on the Installation Restoration Program; a description of the Homestead AFB installation and associated off-base facilities including past activities, mission and environmental setting; a review of industrial activities conducted at Homestead AFB; an inventory of major solid and hazardous waste from past activities; a review of past and present waste handling, treatment and disposal facilities; an evaluation of the pollution potential of waste disposal sites; and recommendations for the Installation Restoration Program, Phase II, Confirmation Study.

We appreciate the opportunity to work with you and the other Air Force personnel who contributed information to us for the completion of this assessment.

Very truly yours,

ENGINEERING-SCIENCE, INC.

E J Schroeder

E.J. Schroeder, P.E.
Manager, Solid & Hazardous Waste

R J Reimer

R.J. Reimer
Chemical Engineer

EJS/RJR/lmr

Enclosure

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The Department of Defense (DOD) has developed a program to identify and evaluate past hazardous material disposal sites on DOD property, to control the migration of hazardous contaminants, and to control hazards to health or welfare that may result from these past disposal operations. This program is called the Installation Restoration Program (IRP). The IRP has four phases consisting of Phase I, Initial Assessment/Records Search; Phase II, Confirmation and Quantification; Phase III, Technology Base Development/Evaluation of Remedial Action Alternatives; and Phase IV, Operations/Remedial Actions. Engineering-Science (ES) was retained by the United States Air Force to conduct the Phase I, Initial Assessment/Records Search for Homestead AFB under Contract No. F33615-80-D-4001,0039.

INSTALLATION DESCRIPTION

Homestead Air Force Base is located in Dade County, Florida, about 25 miles southwest of Miami and seven miles east of Homestead. The base lies about two miles west of Biscayne Bay on the southeastern edge of a shallow marine limestone plate, and is directly above the Biscayne aquifer. The surrounding area is semi-rural, and for most of its perimeter the base borders on agricultural land. The main installation measures 2916 acres in area; easements constitute an additional 429 acres. Several remote installation annexes under the jurisdiction of Homestead AFB were also included in this study. These areas are as follows:

Middle Marker	0.14 acre
Communications Station	20 acres
Richmond AFS	66 acres
Survival Annex	2.75 acres
Cudjoe Key	68.5 acres
Big Coppitt Key	5.2 acres

Helicopter Annex	1 acre
Dock Annex	6.5 acres
Key Largo Annex	4.2 acres
New Well Field	2.4 acres

Homestead Army Airfield was activated in September 1942, when the Caribbean Wing Headquarters acquired a commercial airfield just east of Homestead, Florida. Initially operated by the Army Air Transport Command, in 1943 the field mission was changed to pilot and crew training when the Second Operational Training Unit was activated. Following extensive hurricane damage, the field was placed on inactive status in 1945 and the property was turned over to Dade County. During the next eight years the base was lightly used by crop dusters and housed a few small commercial and industrial operations. The base was reacquired by the Air Force in 1953 and rebuilt, becoming a Strategic Air Command (SAC) base in 1955. B-52's were flown at this time. The command of the base was changed in 1968, to the Tactical Air Command and the 4531st Tactical Fighter Wing (TFW) became the new host unit, flying mainly F-100 C's and D's. In 1970, this wing's designation was changed to the 31st TFW and again in 1981, it was redesignated the 31st Tactical Training Wing. Currently F-4 D's and E's are the main jets flying on base.

ENVIRONMENTAL SETTING

The environmental setting data reviewed for this investigation indicates the following major items that are relevant to the evaluation of past waste management practices at Homestead Air Force Base:

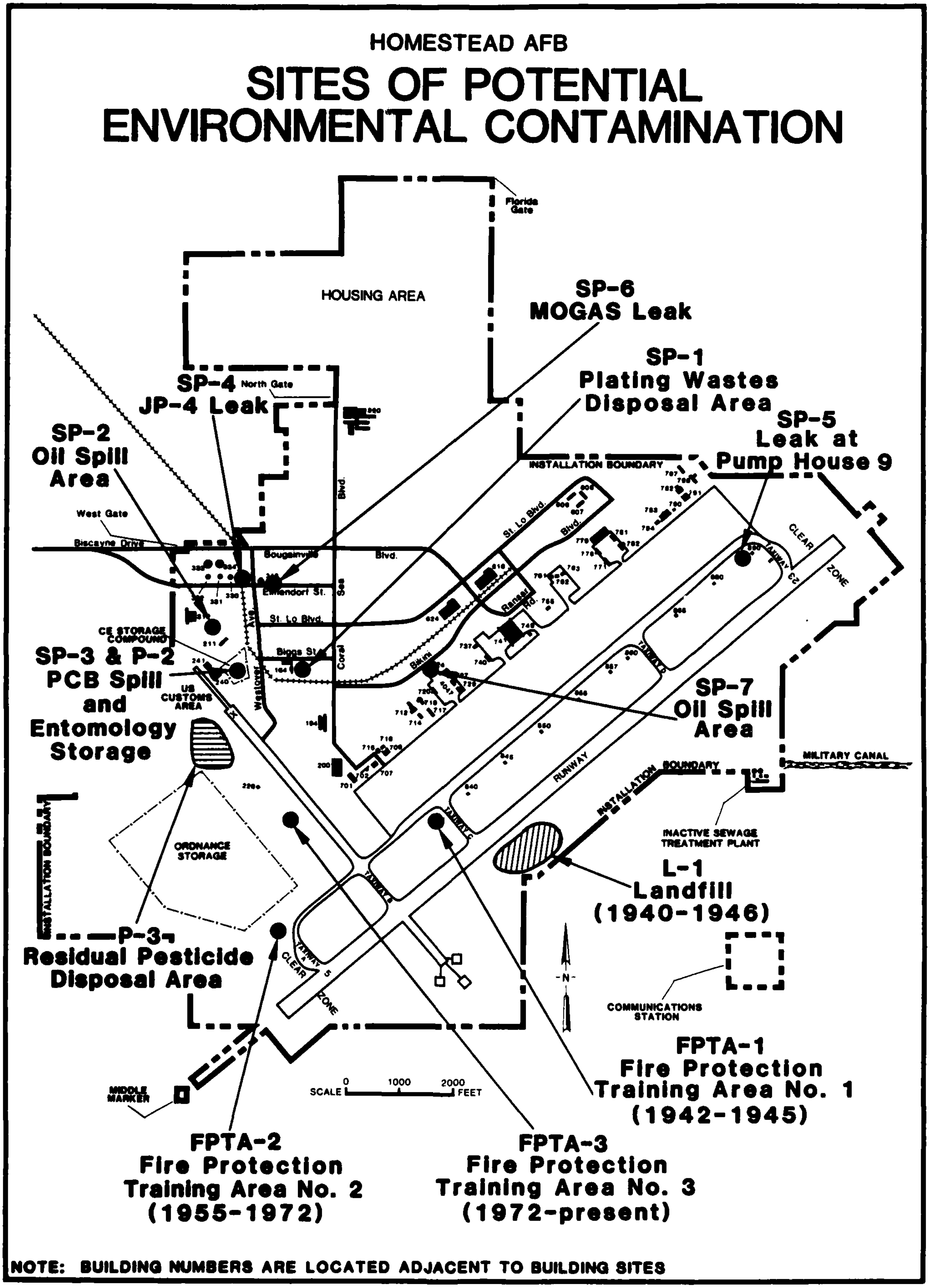
- Mean annual precipitation is 57.9 inches. Net precipitation has been calculated to be 6.4 inches.
- The drainage of runon (entering the base) and runoff (leaving the base) is controlled primarily by the Boundary Canal that surrounds most of the base. Surface drainage from the installation flows to the Boundary Canal and then discharges to Biscayne Bay by way of Military Canal, a Class III surface water.

- Installation surface soils tend to be thin, permeable or completely absent. Rockdale Limestone soils are exposed over sixty percent of the base land area.
- The primary regional aquifer, the Biscayne, underlies Homestead Air Force Base. The highly permeable Miami Oölite, which forms the upper portion of the Biscayne Aquifer, is frequently exposed at ground surface and along the entire Boundary Canal alignment.
- The base lies within the recharge zone of the Biscayne. Annual recharge is estimated to be as much as 38 inches, or 63 percent of total rainfall. Consequently, Biscayne Aquifer water levels are very high, ranging from one-to-six feet below ground surface (at USGS observation well G-1183).
- Salt water intrusion has been shown to be a major threat to the quality of ground water. The implementation of ground-water resource conservation measures have stabilized the "salt water line", which passes beneath Homestead Air Force Base.
- Flooding due to a major storm surge may be a problem at Homestead AFB.
- One hundred acres of base land has been identified as wetlands.
- No known endangered species exist on Homestead AFB. The American alligator and the Eastern Indigo snake, both threatened species, exist on Homestead AFB.

METHODOLOGY

During the course of this project, interviews were conducted with base personnel (past and present) familiar with past waste disposal practices; file searches were performed for past hazardous waste activities; interviews were held with local, state and federal agencies; and field and aerial surveys were conducted at suspected past hazardous waste activity sites. Thirteen sites located within Homestead AFB boundaries were identified as potentially containing hazardous contaminants and having the potential for migration resulting from past activities (Figure 1). These sites have been assessed using a Hazard Assessment Rating Methodology (HARM) which takes into account factors such as site characteristics, waste characteristics, potential for

FIGURE 1



NOTE: BUILDING NUMBERS ARE LOCATED ADJACENT TO BUILDING SITES

contaminant migration and waste management practices. The details of the rating procedure are presented in Appendix G and the results of the assessment are given in Table 1. The rating system is designed to indicate the relative need for follow-on action. The sites have also been reviewed with regard to future land use restrictions.

FINDINGS AND CONCLUSIONS

The following conclusions have been developed based on the results of the project team's field inspection, review of base records and files and interviews with base personnel.

The areas determined to have a moderate-to-high potential for environmental contamination are as follows:

- Oil Spill Area at the Aircraft Washrack (SP-7)
- Oil Leakage behind the Motor Pool (SP-2)
- Fire Protection Training Area - No. 3 (FPTA-3)
- Fire Protection Training Area - No. 2 (FPTA-2)
- MOGAS Leak at BX Service Station (SP-6)
- Entomology Storage Area (P-2)
- Leak at POL Bulk Storage Tank Farm (SP-4)
- Electroplating Waste Disposal Site (SP-1)

The areas determined to have a low potential for environmental contamination are as follows:

- Fire Protection Training Area - No. 1 (FPTA-1)
- Leak at Pump Station No. 9 on Flight Apron (SP-5)
- Residual Pesticide Disposal Area (P-3)
- Landfill (L-1)
- PCB Spill in CE Storage Compound (SP-3)

RECOMMENDATIONS

The recommendations developed for further assessment of environmental concern areas at Homestead AFB are summarized in Table 2.

TABLE 1
SITES ASSESSED USING THE HARM METHODOLOGY
HOMESTEAD AFB

Rank	Site Name and No.	Date of Operation or Occurrence	Overall Total Score
1	Electroplating Waste Disposal Site (SP-1)	1946-1953	72
2	Leak at POL Bulk Storage Tank Farm (SP-4)	1958	69
3	Oil Spills at Aircraft Wash Rack (SP-7)	Early 1970's-1981	69
4	Fire Protection Training Area No. 3 (FPTA-3)	1972-present	66
5	Fire Protection Training Area No. 2 (FPTA-2)	1955-1972	66
6	MOGAS Leak at BX Service Station (SP-6)	1980	64
7	Entomology Storage Area (P-2)	1960's-present	63
8	Oil Leakage Behind Motor Pool (SP-2)	1960's-present	59
9	Fire Protection Training Area No. 1 (FPTA-1)	Early 1940's	59
10	Leak at Pump Station No. 9 on Flight Apron (SP-5)	1982	58
11	Residual Pesticide Disposal Area (P-3)	1977-1982	58
12	Landfill (L-1)	Early 1940's	50
13	PCB Spill in Civil Engineering Storage Compound (SP-3)	1981	7

NOTE: This ranking was performed according to the Hazard Assessment Rating Methodology (HARM) described in Appendix G. Individual site rating forms are in Appendix H.

TABLE 2

SUMMARY OF RECOMMENDED MONITORING PROGRAM FOR PHASE II

HOMESTEAD AFB

Site	Rating Score	Recommend Monitoring	Comments
1) Electroplating Waste Disposal Site (SP-1)	72	Sample existing base well and analyze for parameters in Table 6.2, List B. Additional monitoring wells may be necessary to assess extent of contamination.	Continue monitoring if sampling indicates metals contamination.
2) Leak at POL Bulk Storage Tank Farm (SP-4)	69	Install 1 upgradient and 3 down-gradient ground-water monitoring wells. Wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 to 15 feet deep). Analyze samples for parameters in Table 6.2, List A.	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination.
3) Oil Spills At Aircraft Wash Rack (SP-7)	69	Install 1 upgradient and 2 down-gradient ground-water monitoring wells. Wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 to 15 feet deep). Sample these wells and analyze for parameters in Table 6.2, List C.	Continue monitoring if sampling indicates contamination. GC/MS Scan may be run to identify organic contaminants found. Additional wells may be necessary to assess of contamination.
4) Fire Protection Training Area No. 3 (FPTA-3)	66	Install 1 upgradient and 3 down-gradient ground-water monitoring wells. Wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 to 15 feet deep). Sample these wells and analyze for parameters in Table 6.2, List C. extent of contamination.	Continue monitoring if sampling indicates contamination. GC/MS Scan may be run to identify organic contaminants found. Additional wells and/or soil samples may be necessary to assess
5) Fire Protection Training Area No. 2 (FPTA-2)	66	Install 1 upgradient and 2 down-gradient ground-water monitoring wells. Wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 to 15 feet deep). Sample these wells and analyze for parameters in Table 6.2, List C.	Continue monitoring if sampling indicates contamination. GC/MS Scan may be run to identify organic contaminants found. Additional wells may be necessary to assess extent of contamination.
6) MOGAS Leak at BX Service Station (SP-6)	64	Install 1 upgradient and 2 down-gradient ground-water monitoring wells. Wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 to 15 feet deep). Sample these wells and analyze for parameters in Table 6.2, List D.	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination. Collect and analyze 5 local soil samples for the same parameters.
7) Entomology Storage Area in CE, Storage Compound (P-2)	63	Collect 5 soil samples in immediate area and perform water extraction on them. Analyze extract for parameters in Table 6.2, List E.	Establish additional sampling stations if contamination is found to determine the extent of contamination.
8) Oil Leakage Behind Motor Pool (SP-2)	59	Collect 5 soil samples and 3 surface water samples in area of oil leakage. Perform water extractions on soil samples. Analyze for the presence of compounds identified in Table 6.2, List D.	Establish additional sampling stations if contamination is found to determine the extent of contamination.

CHAPTER 1

INTRODUCTION

BACKGROUND AND AUTHORITY

The United States Air Force, due to its primary mission, has long been engaged in a wide variety of operations dealing with toxic and hazardous materials. Federal, state, and local governments have developed strict regulations to require that disposers identify the locations and contents of disposal sites and take action to eliminate the hazards in an environmentally responsible manner. The primary Federal legislation governing disposal of hazardous waste is the Resource Conservation and Recovery Act (RCRA) of 1976, as amended. Under Section 6003 of the Act, Federal agencies are directed to assist the Environmental Protection Agency (EPA) and under Section 3012, state agencies are required to inventory past disposal sites and make the information available to the requesting agencies. To assure compliance with these hazardous waste regulations, DOD developed the Installation Restoration Program (IRP). The current DOD IRP policy is contained in Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5, dated 11 December 1981 and implemented by Air Force message dated 21 January 1982. DEQPPM 81-5 reissued and amplified all previous directives and memoranda on the Installation Restoration Program. DOD policy is to identify and fully evaluate suspected problems associated with past hazardous contamination, and to control hazards to health and welfare that resulted from these past operations. The IRP will be the basis for response actions on Air Force installations under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, and clarified by Executive Order 12316.

PURPOSE AND SCOPE OF THE ASSESSMENT

The Installation Restoration Program has been developed as a four-phased program as follows:

Phase I	- Initial Assessment/Records Search
Phase II	- Confirmation and Quantification
Phase III	- Technology Base Development/Evaluation of Remedial Action Alternatives
Phase IV	- Operations/Remedial Actions

Engineering-Science (ES) was retained by the United States Air Force to conduct the Phase I Records Search at Homestead Air Force Base under Contract No. F33615-80-D-4001, 0039. This report contains a summary and an evaluation of the information collected during Phase I of the IRP. The land areas included as part of the Homestead AFB study are as follows:

Main Base Site	2916 acres
Middle Marker	0.14 acre
Communications Station	20 acres
Richmond AFS	66 acres
Survival Annex	2.75 acres
Cudjoe Key	68.5 acres
Big Coppitt Key	5.2 acres
Helicopter Annex	1 acre
Dock Annex	6.5 acres
Key Largo Annex	4.2 acres
New Well Field	2.4 acres

The goal of the first phase of the program was to identify the potential for environmental contamination from past waste disposal practices at Homestead AFB, and to assess the potential for contaminant migration. The activities that were performed in the Phase I study included the following:

- Reviewed site records
- Interviewed personnel familiar with past generation and disposal activities
- Inventoried wastes

- Determined estimated quantities and locations of current and past hazardous waste treatment, storage, and disposal
- Defined the environmental setting at the base
- Reviewed past disposal practices and methods
- Conducted field and aerial inspection
- Gathered pertinent information from Federal, state and local agencies
- Assessed potential for contaminant migration.

ES performed the on-site portion of the records search during April 1983. The following core team of professionals were involved:

- J. R. Absalon, Hydrogeologist, BS Geology, 9 years of professional experience
- D. S. Fry, Civil Engineer, BS Civil Engineering, 8 years of professional experience
- R. J. Reimer, Chemical Engineer, MSChE, 4 years of professional experience
- E. J. Schroeder, Environmental Engineer and Project Manager, MSCE, 16 years of professional experience

More detailed information on these individuals is presented in Appendix A.

METHODOLOGY

The methodology utilized in the Homestead AFB Records Search began with a review of past and present industrial operations conducted at the base. Information was obtained from available records such as shop files and real property files, as well as interviews with 59 past and present base employees from the various operating areas. Those interviewed included current and past personnel associated with the Civil Engineering Squadron, Bioenvironmental Engineering Services, Aircraft Generation Squadron, Equipment Maintenance Squadron, and Fuels Management Branch. Experienced personnel from past tenant organizations were also interviewed. A listing of Air Force interviewees by position and approximate period of service is presented in Appendix B.

Concurrent with the base interviews, the applicable Federal, state and local agencies were contacted for pertinent base related environmental data. The agencies contacted and interviewed are listed below as well as in Appendix B.

- o U.S. Environmental Protection Agency (EPA)
- o U.S. Geological Survey (USGS), Water Resources Division
- o Florida Department of Environmental Regulation (FDER)
- o South Florida Water Management District, Ground Water Division
- o Dade County Department of Environmental Resource Management (DERM)

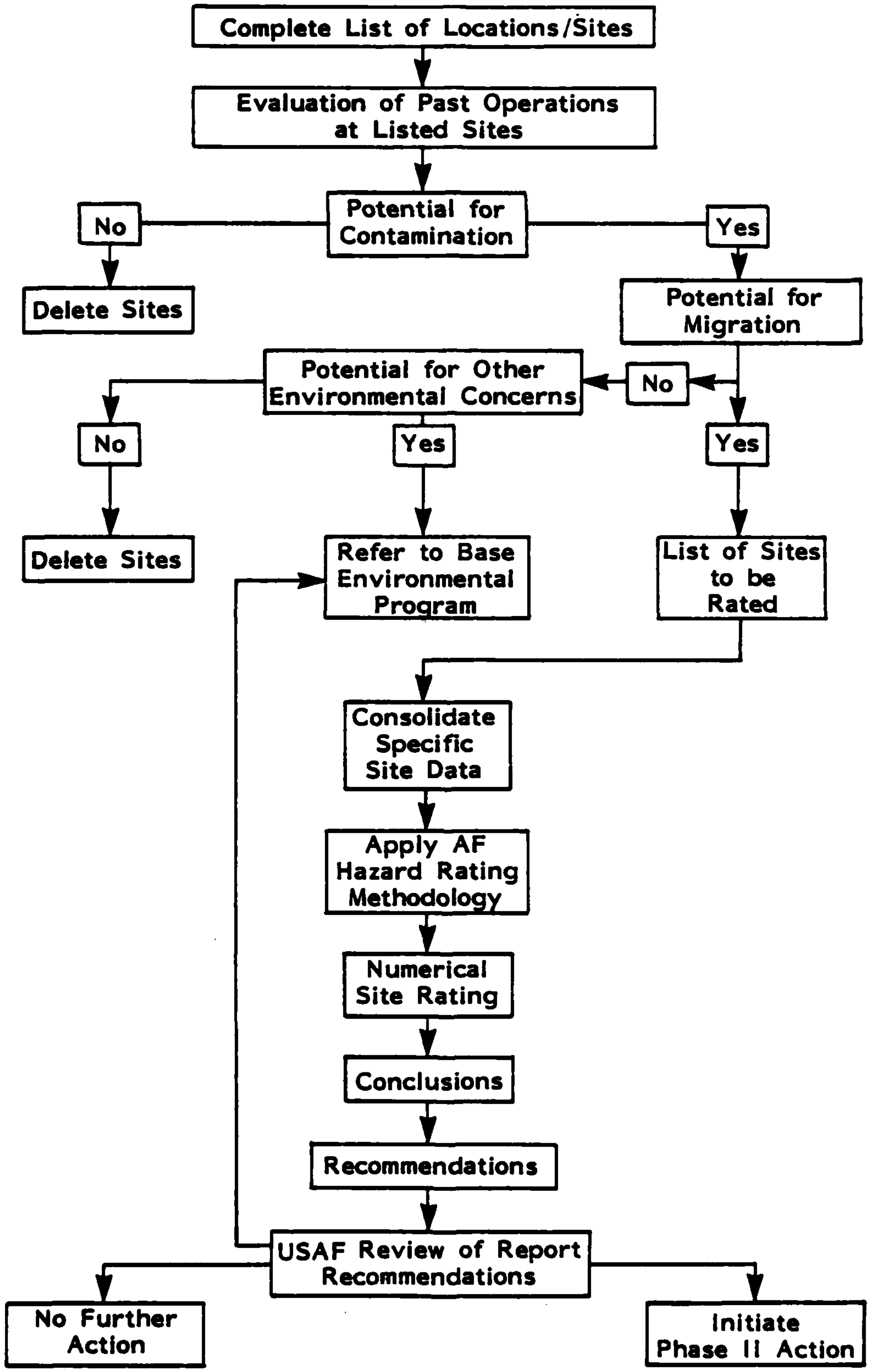
The next step in the activity review was to determine the past management practices regarding the use, storage, treatment, and disposal of hazardous materials from the various operations on the base. Included in this part of the activities review was the identification of all known past disposal sites and other possible sources of contamination such as spill areas.

A general ground tour and a helicopter overflight of the identified sites were then made by the ES Project Team to gather site-specific information including: (1) visual evidence of environmental stress; (2) the presence of nearby drainage ditches or surface water bodies; and (3) visual inspection of these water bodies for any obvious signs of contamination or leachate migration.

A decision was then made, based on all of the above information, whether a potential exists for hazardous material contamination at any of the identified sites using the Decision Tree shown in Figure 1.1. If no potential existed, the site was deleted from further consideration. For those sites where a potential for contamination was identified, a determination of the potential for migration of the contamination was made by considering site-specific conditions. If there were no further environmental concerns, then the site was deleted. If the potential for contaminant migration was considered significant, then the site was evaluated and prioritized using the Hazard Assessment Rating Methodology

PHASE I INSTALLATION RESTORATION PROGRAM

DECISION TREE



(HARM). A discussion of the HARM system is presented in Appendix G. The sites that were evaluated using the HARM procedures were also reviewed with regard to future land use restrictions.

CHAPTER 2

INSTALLATION DESCRIPTION

LOCATION, SIZE, AND BOUNDARIES

Homestead Air Force Base is located in Dade County, Florida, about 25 miles southwest of Miami and seven miles east of Homestead (Figures 2.1 and 2.2). The base lies about two miles west of Biscayne Bay on the southeastern edge of a shallow marine limestone plate, and is directly above the Biscayne aquifer. The surrounding area is semi-rural, and for most of its perimeter the base borders on agricultural land. According to the Homestead AFB Real Estate Management Office, the main installation measures 2916 acres of fee-owned land in area (Figure 2.3); easements constitute an additional 429 acres.

Several remote installation annexes under the jurisdiction of Homestead AFB were also included in this study. These sites are identified below with their locations depicted in Figure 2.2.

1. Homestead Middle Marker - 0.14 acres (owned) located approximately 1800 feet outside the base within the approach path for runway 05. The site is used to provide navigational markings.
2. Homestead Communications Station - 20 acres (owned) located approximately 3500 feet southeast of the main base. Transmitters and other communications equipment are located at the site.
3. Richmond AFS - 66 acres (owned) located approximately 12 miles north of the base. The site is part of a former Naval Air Station. It currently used as a radar installation.

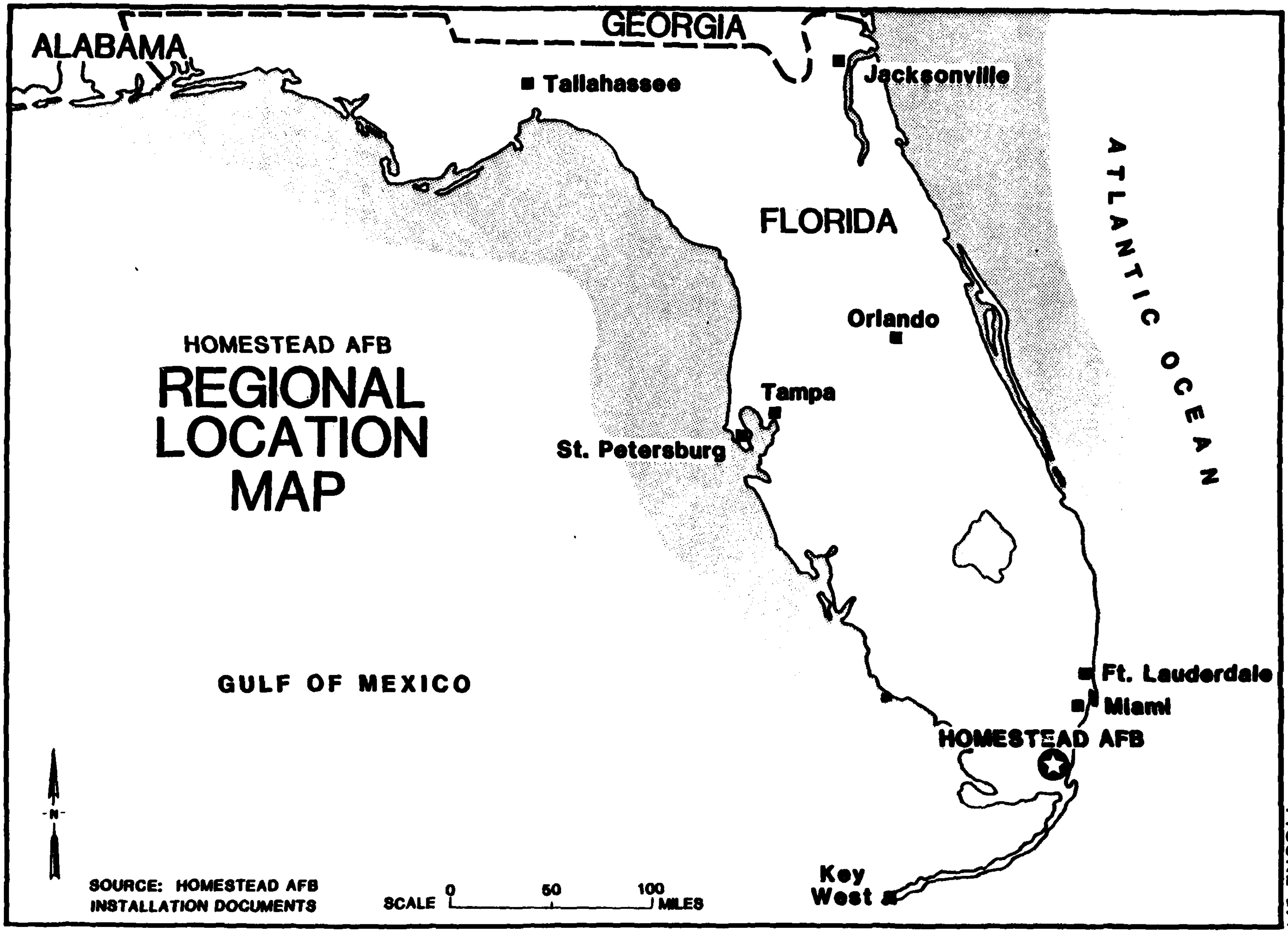
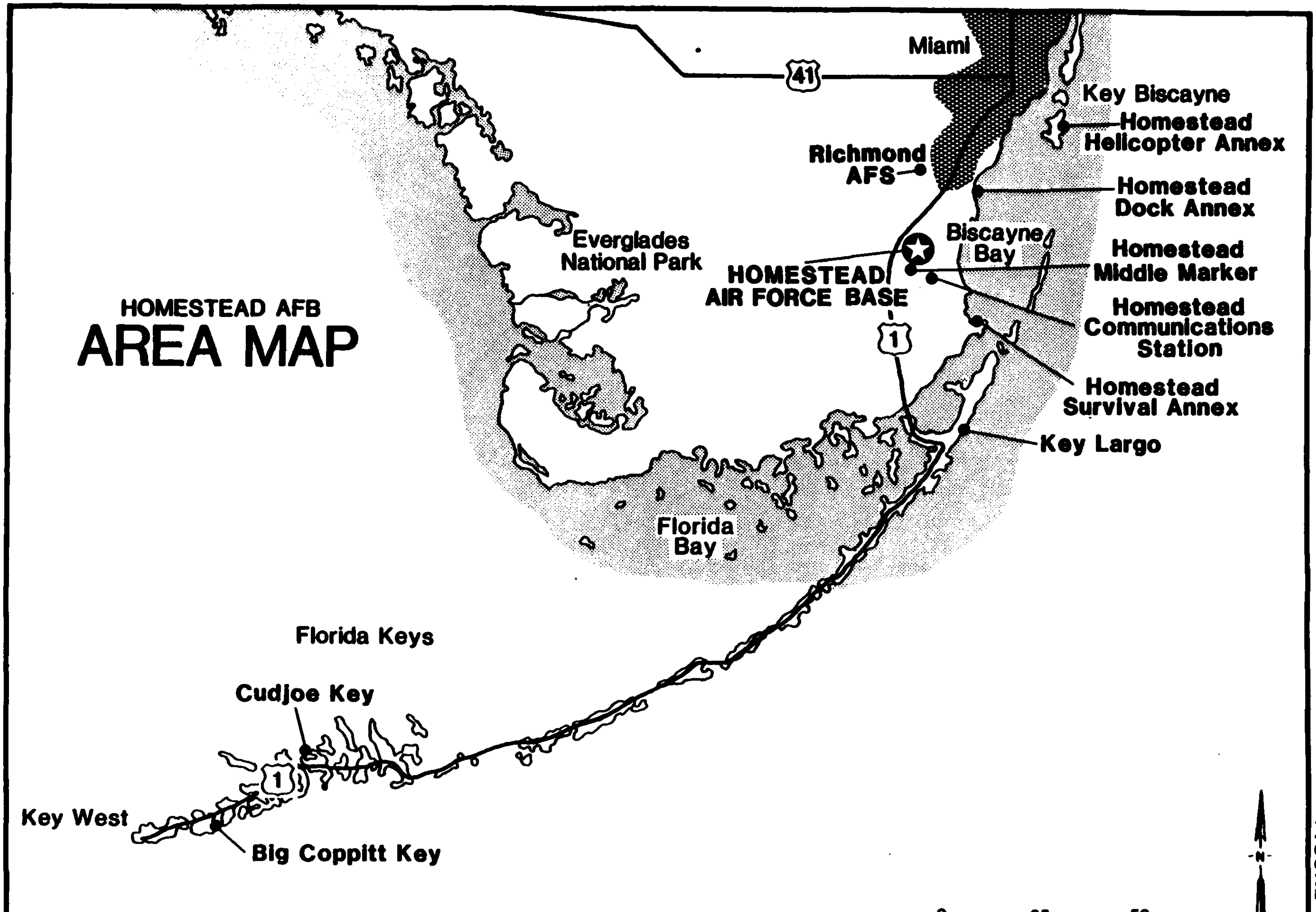


FIGURE 2.1

ES ENGINEERING-SCIENCE

FIGURE 2.2

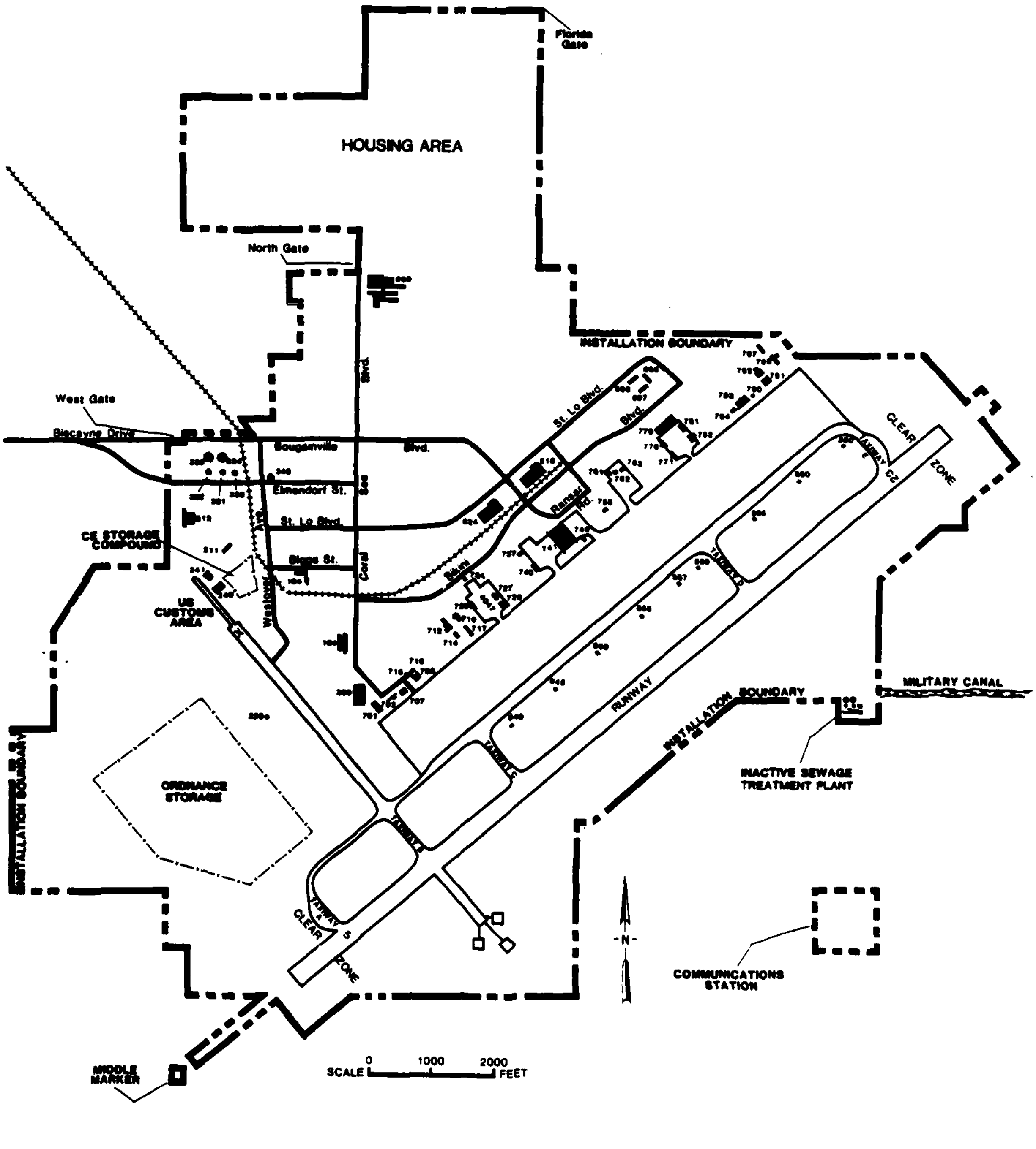


SOURCE: HOMESTEAD AFB INSTALLATION DOCUMENTS

ES ENGINEERING - SCIENCE

FIGURE 2.3

HOMESTEAD AFB
SITE PLAN



NOTE: BUILDING NUMBERS ARE LOCATED ADJACENT TO BUILDING SITES

SOURCE: HOMESTEAD AFB INSTALLATION DOCUMENTS

ES ENGINEERING-SCIENCE

4. Homestead Survival Annex - 2.75 acres (leased) located at Turkey Point, approximately 15 miles southeast of the main base on Biscayne Bay. The site is used by the Sea Survival Training School.

5. Cudjoe Key - 68.5 acres (owned) located approximately 120 miles southwest of the main base, in the Florida Keys. The site serves as a communications station. It contains a shop and a small fuel storage facility.

6. Big Coppitt Key - 5.2 acres located approximately 140 miles southwest of the main base, in the Florida Keys. The property is owned by the Air Force but is currently being used by the Army as a communications site.

7. Homestead Helicopter Annex - 1 acre (owned) located on Key Biscayne, approximately 25 miles northeast of the main base. A helicopter pad is located at the site.

8. Homestead Dock Annex - 6.5 acres (leased) located at King's Bay Marina, approximately 15 miles northeast of the main base. The site is used as a recreational area.

9. Key Largo - 4.2 acres (owned) located approximately 20 miles south of the main base in the Florida Keys. The site serves as a communications station.

10. New Well Field - 2.4 acres (owned) located approximately 1 miles west of the main base. Three new drinking water supply wells are located here.

BASE HISTORY

Homestead Army Air Field was activated in September 1942 when the Caribbean Wing Headquarters took over the airfield previously used by Pan American Air Ferries, Inc. The airline had developed the site a few years earlier, and used it primarily for pilot training. Prior to that time, the site was undeveloped.

Initially, Homestead Army Air Field served as a staging facility for the Army Air Transport Command, which had as its mission the maintenance and dispatching of aircraft for transport to overseas locations. In 1943, the field mission was changed when the Second Operational Training Unit was activated to train transport pilots and crews.

In September of 1945, a severe hurricane resulted in extensive damage to the airfield. Both the high cost of rebuilding the field and the anticipated post-war reductions in military activities led to Homestead's being placed in an inactive status in October of 1945. The base property was turned over to Dade County which retained possession of it for the next eight years. During this time, the base was managed by the Dade County Port Authority and was lightly used by crop dusters, as well as housing a few small industrial and commercial operations.

In 1953, the Federal Government again acquired the Homestead facility, along with some surrounding property, and over the next two years rebuilt it as a Strategic Air Command (SAC) base. The first operational squadron arrived at Homestead in February 1955, and the base was formally reactivated in November of the same year. Except for a short period during 1960, when modifications were made to accommodate B-52's at Homestead, it remained an operational SAC base until 1968.

The command of Homestead was changed from SAC to the Tactical Air Command (TAC) in July of 1968, and the 4531st Tactical Fighter Wing (TFW) became the new host unit. F-100 C's and D's were flown during this time. When the 31st TFW returned from Southeast Asia during

October of 1970, the designation 4531st TFW was deactivated and the 31st TFW became the host unit for Homestead AFB, flying F-4 D's and E's. In 1981, the 31st was redesignated the 31st Tactical Training Wing (TTW), since which time there have been no major changes in organization or mission at the base. Since TAC assumed command of the base, mainly F100's and F-4's have been flown.

ORGANIZATION AND MISSION

The present host unit at Homestead AFB, the 31st TTW, has as its primary mission to conduct Replacement Training Unit (RTU) operations for the training of combat qualified aircrews in the F-4D Phantom II. The 31st TTW is also responsible for operating Homestead AFB and providing support to a large number of tenant units. The tenant organizations at Homestead AFB are listed below. Descriptions of the major tenant organizations and their missions are presented in Appendix C.

USAF Area Audit Office (AFAA)
USAF Element/Project Administration Support
American Red Cross
OL1B A.F. Commissary Service
Company H, Marine Support Battalion
Defense Investigative Service, Miami Field Office
Defense Property Disposal Office (DPDO)
Det 1, 40th Aerospace Rescue and Recovery Squadron (MAC)
Det 3, OLAK, 23rd Air Defense Squadron (located at Richmond AFS)
Det 4, OLAM, 23rd Air Defense Squadron (located at Cudjoe Key)
Det 6, 3rd Weather Squadron (MAC)
Det 7, 4400th Management Engineering Squadron
Det 707, USAF Office of Special Investigations, District 7
Field Training Detachment 319 (ATC)
US Navy Security Group
US Navy Personnel Support Activity
US Army Criminal Investigation (CID)
US Army Corps of Engineers
US Customs Service
US Postal Branch, Homestead

United Services Organization

USAF Trial Judiciary, Area Defense Counsel

301st Aerospace Rescue and Recovery Squadron (AFRES)

726th Tactical Control Squadron

482nd Tactical Fighter Wing (AFRES)

70th Aerial Port Sqaudron (AFRES)

90th Aerial Port Squadron (AFRES)

93rd Tactical Fighter Squadron

1942nd Communications Squadron (AFCC)

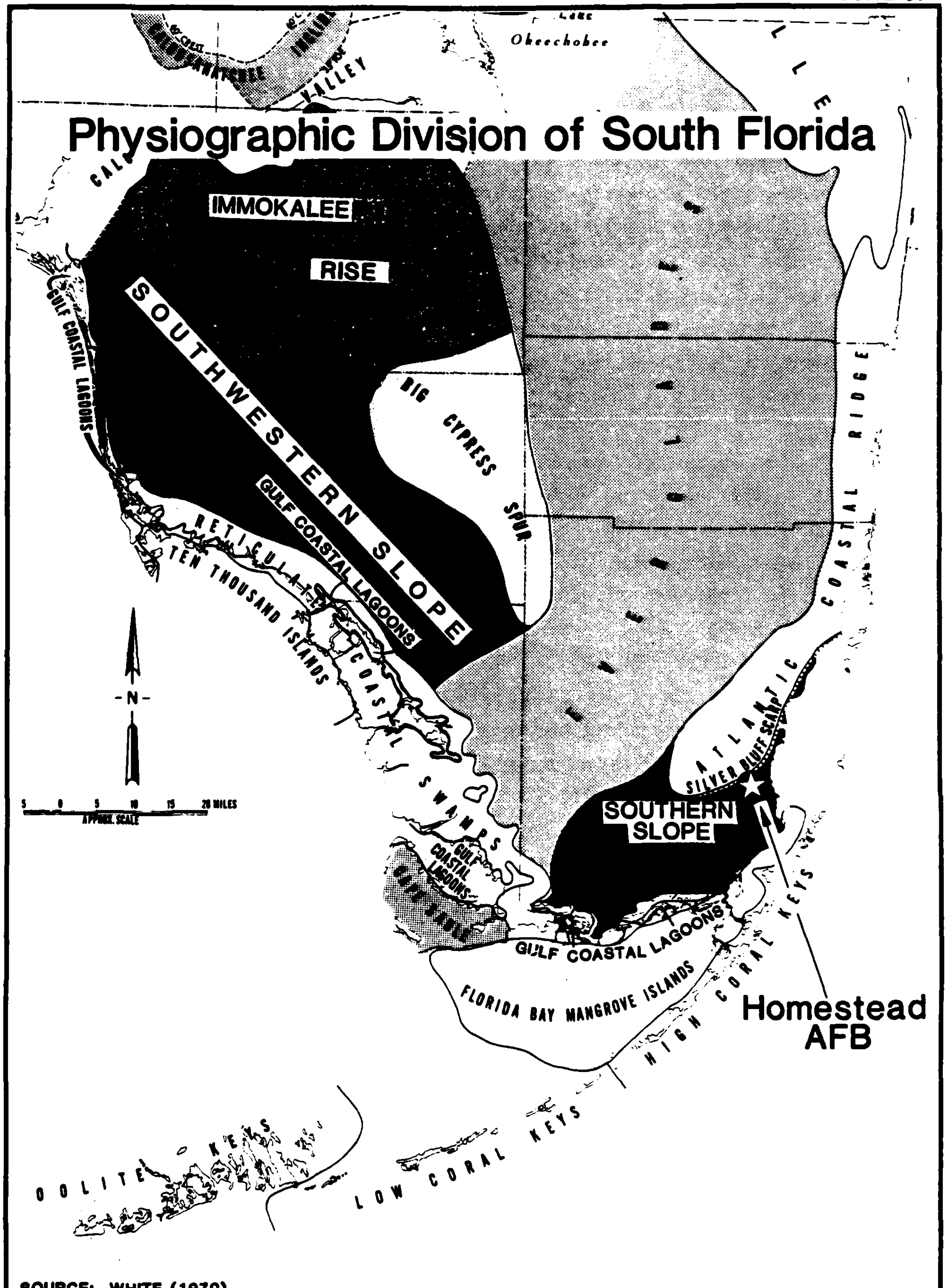
3613th Combat Crew Training Squadron (ATC)

US Air Force Water Survival School

6947th Electronics Security Squadron

644th Radar Squadron (ADC)

FIGURE 3.1



SOURCE: WHITE (1970)

ES ENGINEERING-SCIENCE

1970). This effect has created a landscape dominated by broad swamps typically exhibiting impaired surface drainage.

Limestone bedrock crops out or may be covered by thin accumulations of swamp-related materials. One example of a bedrock outcrop is the severely eroded "Silver Bluff Scarp" that extends through the study area. The scarp is a wave-dissected expression of a former shoreline that has been cut into soft limestone and rarely exceeds ten feet in height, where relief is apparent. The scarp is considered to be the east boundary of the Miami (Coastal) Ridge. Figure 3.1 depicts study area physiographic divisions.

Topography

The topography of Homestead Air Force Base is generally level, with little spatial variation apparent. Local relief is usually the result of installation development activities. City of Homestead surface elevations average eight feet, MSL. Installation surface elevations range from five feet MSL along the base south boundary, to 9.9 feet in the north housing area. The average surface elevation is seven feet, MSL, along the flightline.

Drainage

Drainage of Homestead Air Force Base land areas is accomplished by overland flow to diversion structures and then to the Boundary Canal. The Boundary Canal partially encircles the installation, collecting all runoff emanating from it. A dike just outside the canal prevents runon from entering the canal and/or the base. Drainage from the Boundry Canal is then directed to the storm water reservoir which connects to the Military Canal. The Canal terminates in Biscayne Bay, two miles east of the base. Schroeder, et al., (1958) report that of an annual rainfall of 60 inches, 38 inches is lost to internal drainage (i.e., ground-water recharge) and 22 inches is discharged by evapotranspiration and surface water runoff.

According to installation documents, 100-year flood elevations may reach a high elevation of 12 feet, MSL at the east third of the installation area, where present land surface elevations average seven feet. Installation drainage features and flood limits are depicted on Figure 3.2. Low areas along the east, south and west installation boundaries are protected by a dike which roughly parallels the boundary canal.

CHAPTER 3

ENVIRONMENTAL SETTING

The environmental setting of Homestead Air Force Base is described in this chapter with the primary emphasis directed toward identifying features or conditions that may facilitate the movement of hazardous waste contaminants. A summary of the environmental setting relevant to the study is presented at the conclusion of this section.

METEOROLOGY

Temperature and precipitation data furnished by Detachment 6, 3rd Weather Squadron, Homestead AFB, are presented as Table 3.1. The period of record is 37 years. The summarized data indicate that the mean annual precipitation is 57.9 inches. This corresponds with the value obtained from the National Oceanic and Atmospheric Administration (NOAA) Climatic Atlas of the United States (1977). The NOAA has determined that the mean annual Class A pan evaporation for the area is 66 inches with a 78 percent coefficient. The pan coefficient is a ratio of annual lake-to-pan evaporation. These values result in a calculated net precipitation of 6.4 inches. The one-year 24-hour rainfall intensity is 11.24 inches, recorded November, 1982; at Homestead AFB.

GEOGRAPHY

Homestead Air Force Base sits astride the Atlantic Coastal Ridge and the Southern Coastal Slope, subdivisions of the southern or distal zone of the Atlanta Coastal Plain Physiographic Province. The Atlantic Ridge is a slightly elevated surface above the shoreline to the east and the swamps to the west.

Lakes generally do not occur in the distal zone because the prevailing piezometric surface (elevation to which ground water might rise) occurs at or above the generally level topographic surface (White,

TABLE 3.1
HOMESTEAD AFB CLIMATIC CONDITIONS
Period of Record: 1943-1980

MONTH	Temperature (°F)					Precipitation (In)			
	Mean			Extreme		Monthly			
	Daily		Monthly						Max
	Max	Min		Max	Min	Mean	Max	Min	24 Hrs
Jan	74	59	67	84	28	1.9	7.1	.1	4.5
Feb	75	59	67	88	37	2.0	5.8	#	2.4
Mar	78	64	71	90	39	2.1	11.4	.2	7.4
Apr	81	68	75	92	45	2.3	8.3	.1	5.4
May	84	71	78	95	55	7.1	23.3	.1	8.2
Jun	86	75	81	98	67	9.1	20.7	2.3	6.0
Jul	88	76	82	96	68	6.9	13.7	1.7	3.6
Aug	89	76	82	95	68	6.6	13.7	1.9	3.9
Sep	87	76	82	94	64	8.2	23.5	2.2	8.7
Oct	84	72	78	92	53	7.1	14.3	.5	6.2
Nov	79	66	73	88	40	2.4	8.5	.1	4.0
Dec	75	61	68	86	36	1.6	3.8	.2	2.8
Annual	82	69	75	98	28	57.9	23.5	#	8.7

Source: Detachment 6, 3rd Weather Squadron (1983)

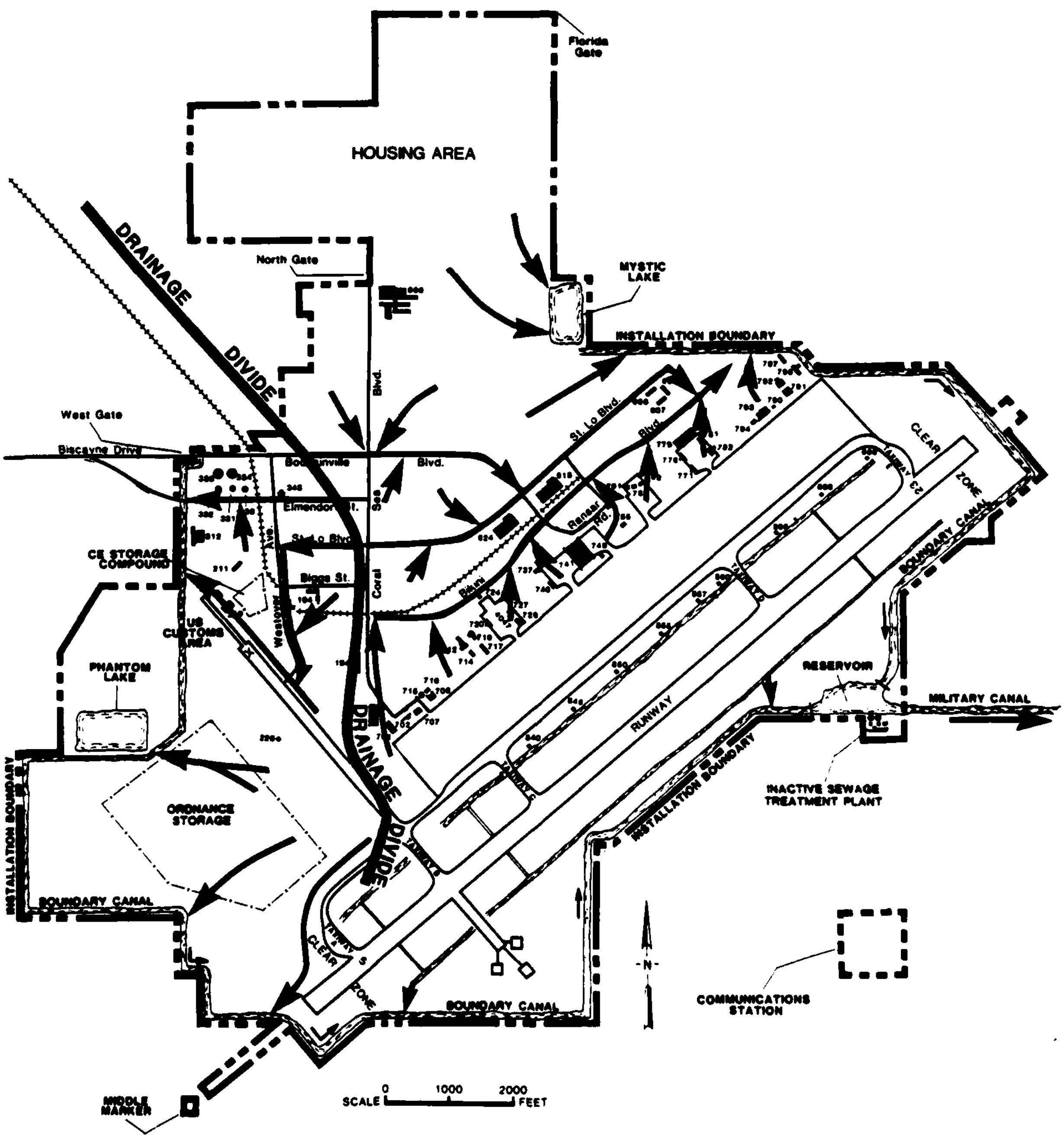
Note: New Records, Month and Max. Precip. (These new records for 24-hour precipitation were observed by Det 6, 3 WS at Homestead AFB after the period of record for Table 3.1 had ended.)

1) Jan. 83 - 8.04"
2) Feb. 83 - 6.77"
3) Nov. 82 - 11.24"

#: Trace

FIGURE 3.2

HOMESTEAD AFB
SURFACE DRAINAGE



NOTE: BUILDING NUMBERS ARE LOCATED ADJACENT TO BUILDING SITES

SOURCE: HOMESTEAD AFB INSTALLATION DOCUMENTS

One hundred acres of installation land area have been identified as wetlands.

Surface Soils

Study area surface soils have been described in a report issued by USDA, Soil Conservation Service (1958). All installation soil units typically impose severe constraints on the development of waste disposal facilities. Installation soils may be divided into two major groups, marls and the Rockdale-limestone complex. The marls form a thin veneer of calcareous fine grained soils overlying limestone bedrock. The clays have typically poor drainage characteristics, but possess shallow water levels and afford little effective cover to the highly permeable limestone beneath. The limestone complex soils are permeable residual soils also overlying the limestone bedrock. These materials normally occur as a thin cover or as a fill in the numerous solution cavities that have developed in the limestone. Frequently, the unit is absent, exposing the very permeable limestone at ground surface. It is estimated from Figure 3.3 that sixty percent of the installation lies on Rockdale Limestone. Table 3.2 summarizes base soils information. Figure 3.3 depicts the distribution of soil units at Homestead Air Force Base.

GEOLOGY

A summary of the Homestead Air Force Base geologic setting has been prepared, based upon reports published by the Florida Bureau of Geology and the U.S. Geological Survey (USGS). Additional information has been obtained from interviews with USGS personnel.

Stratigraphy

Geologic units ranging in age from Eocene to Recent have been identified in the study area. Table 3.3 summarizes the major units and describes their characteristics in chronological order. The lithologies of these units include gravel, sand, silt, clay, marl, shell beds, coquina, limestone and sandstone. In many cases, consolidated and unconsolidated materials may alternate within geologic units, as a result of changes within past depositional environments. It is interesting to note that although limestone may crop out within the study area (example: Miami Oölite), it is often replaced laterally and underlain by significant thicknesses of unconsolidated deposits.

Distribution and Structure

The surface distribution of geologic units relevant to this study is presented as Figure 3.4, which has been modified from Lane (1981). Generally, the geology of Homestead Air Force Base is dominated by a relatively thin section of Miami Oölite, a soft marine limestone named for the small circular structures occurring within it. Good examples of the Oölite and its character are revealed in the Boundary Canal alignment which has been excavated into this unit. The Miami Oölite is present at within two feet of ground surface and frequently possesses solution channels or cavities (Lane, 1981). Cavities present at ground surface are typically soil-filled. This unit may grade laterally into the following contemporaneous units: Anastasia Formation (coquina, sand, sandstone and limestone), the Key Largo Limestone (coralline reef rock) and the Fort Thompson Formation (marls, limestone and sandstone). In the study area, the Miami is about twenty feet thick and is underlain by the Fort Thompson Formation (Parker, et al., 1955). North of the study area in the City of Miami, the Oolite is underlain by the Anastasia Formation (Garcia-Bengochea, 1970). The character of the Miami and Fort Thompson are depicted on Figures 3.5 and 3.6, the logs of installation test borings 22 and 46, respectively. The boring logs indicate that (at the drilling locations) soil cover is absent, the very porous Miami Oölite is present at ground surface and is immediately underlain by a harder, but also porous, limestone (probably the Fort Thompson) at depths of 12 to 24 feet below ground surface. Test boring locations are shown on Figure 3.12.

HYDROLOGY

The complex hydrologic situation operating in South Florida has a direct bearing upon the evaluation of past waste management impacts. The numerous reports listed in the bibliography were reviewed for initial information. Additional hydrologic details were then obtained from interviews with South Florida Water Management District (SFWMD), Dade County Department of Environmental Resource Management (DERM) and U.S. Geological Survey (USGS) personnel.

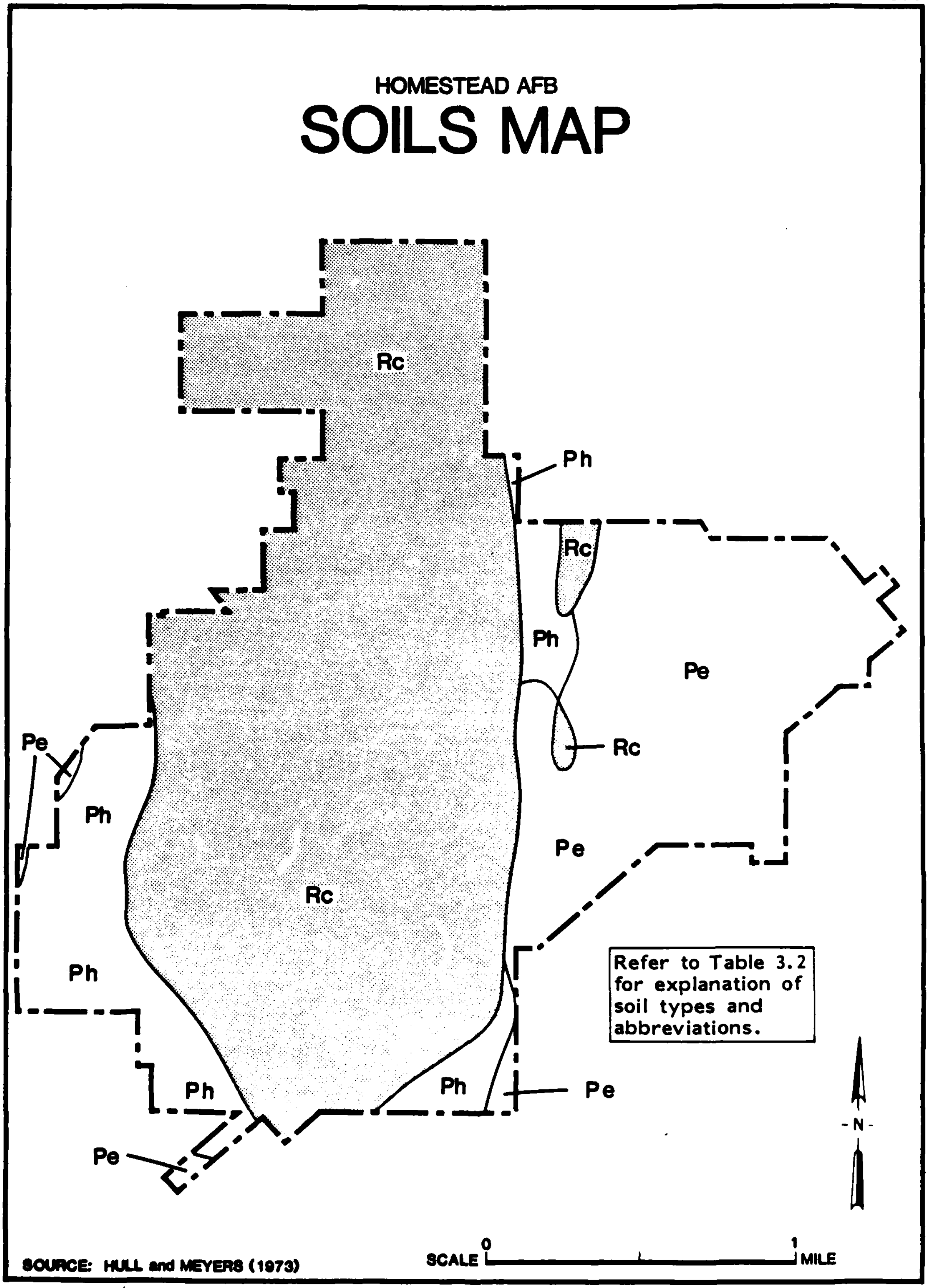
TABLE 3.2
HOMESTEAD AIR FORCE BASE SOILS

Map Symbol	Unit Description	USDA Texture (Major Fraction)	Thickness (Inches)	Unified Class. (Major Fraction)	Drainage	Disposal Facility Use Constraints
Pe	Perrine marl,* shallow phase	Silt loam	24	CL	Poor	Severe. High water table. Permeable bedrock two feet below surface.
Ph	Perrine marl,* very shallow phase	Silt loam	12	CL	Poor	Severe. High water table. Permeable bedrock one foot below surface.
Rc	Rockdale limestone	Fine sandy loam	24	SP, SM	Rapid	Severe. High water table. High permeability. This soil normally occurs as solution cavity fill in bedrock, which is frequently exposed.

Source: USDA, Soil Conservation Service (1958)

* Marl is defined as a calcareous clay or a mixture of clay and calcite or dolomite particles; shell fragments may be present.

FIGURE 3.3



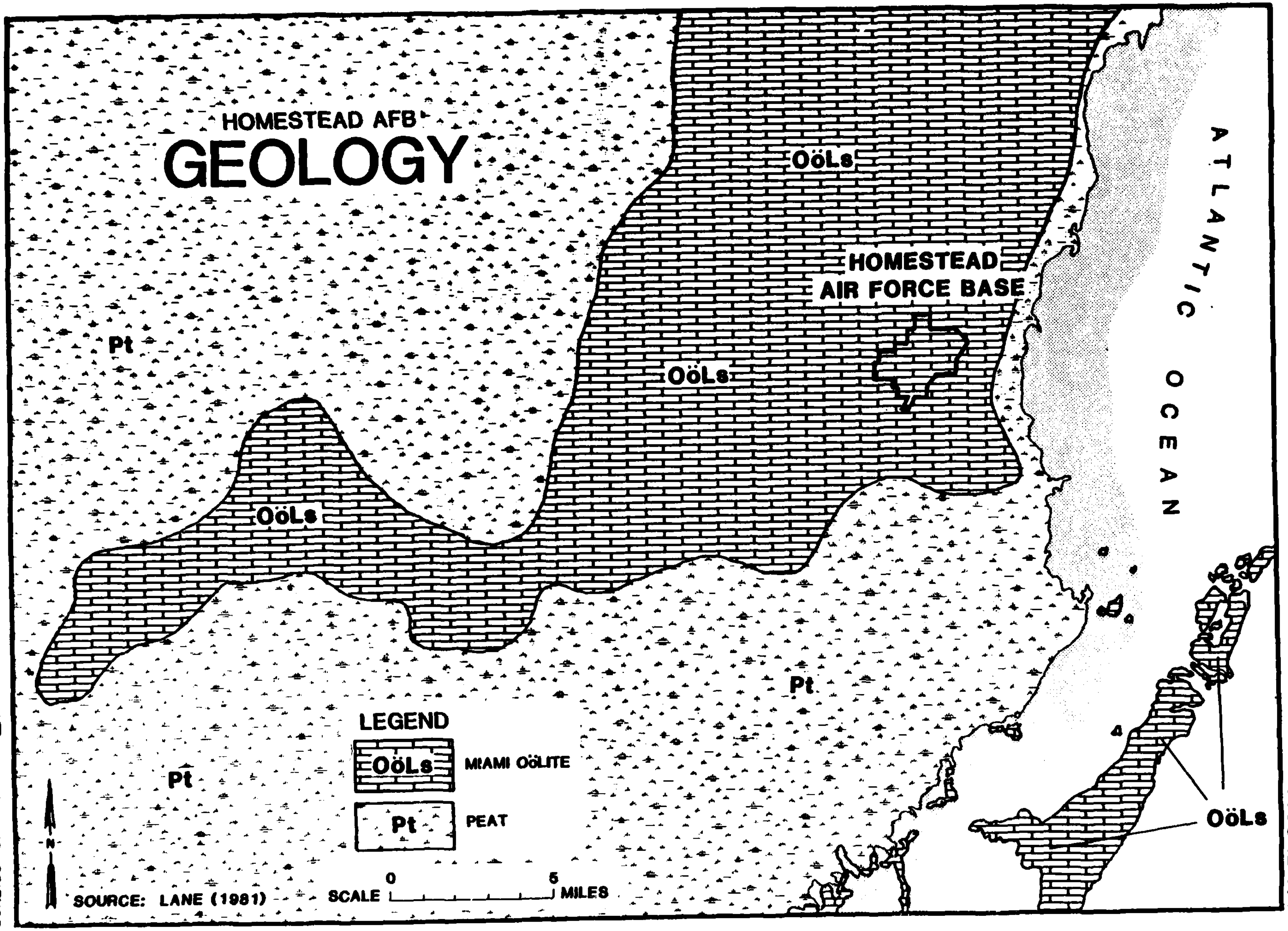
ES ENGINEERING-SCIENCE

TABLE 3.3
GEOLOGIC UNITS OF SOUTHEASTERN FLORIDA

Period	Epoch	Formation	Characteristics	Thickness (feet)
Quaternary	Recent and Pleistocene	Modern soils	Peat and muck, all Recent in age; laterite.	0-12
Quaternary	Recent and Pleistocene	Lake Flint marl	White to gray calcareous mud rich with shells of Helisoma sp., a fresh-water gastropod. In places case-hardened to a dense limestone. Relatively impermeable.	0-6
Quaternary	Pleistocene	Pamlico sand	Quartz sand, white to black or red, depending upon nature of staining materials, very fine to coarse, averaging medium. Mantles large areas underlain by oolite and the Anastasia formation. Occurs in sand dunes and old beach ridges in elevations up to about 60 feet. Yields water to sand-point wells.	0-60
Quaternary	Pleistocene	High terrace deposits (including Penholoway and Talbot formations)	Principally unconsolidated quartz sand with intercalated clay and silt beds in places, especially the Kissimee River area. Locally consolidated to scabby ferric sandstone. Generally permeable. Yields water to sand-point wells.	0-100
Quaternary	Pleistocene	Miami oölite	Limestone, soft, white to yellowish, containing streaks or thin layers of calcite, massive to crossbedded and stratified; generally perforated with vertical solution holes. Fair to very high permeability.	0-40
Quaternary	Pleistocene	Anastasia formation	Coquina, sand, calcareous sandstone, sandy limestone, and shell marl. Composed of deposits equivalent in age to the marine members of Fort Thompson formation. Fair to high permeability.	0-100
Quaternary	Pleistocene; These units may be contemporaneous	Key Largo limestone	Coralline reef rock, ranging from hard and dense to soft and cavernous. Probably contemporaneous with the marine members of the Fort Thompson formation. Outcrops along southeastern coastline of Florida from Soldier Key in Biscayne Bay to Bahia Honda. Highly permeable.	0-60
Quaternary	Pleistocene	Fort Thompson formation	Alternating marine, brackish, and fresh-water marls, limestones, and sandstones. Very low permeability in the upper Everglades-Lake Okeechobee area, but it is the major component of the highly permeable Biscayne aquifer (see p. 160) of coastal Dade, Broward, and Palm Beach Counties, which yields copious supplies of ground water.	0-200
Tertiary	Pliocene	Caloosahatchee marl	Sandy marl, clay, silt, sand, and shell beds. Yields some water, in places under low artesian head, but is little used because of low permeability and generally poor quality of water, especially in the Everglades-Lake Okeechobee area. Not nearly so widely spread as was once believed but occurs chiefly as erosion remnants.	0-50
Tertiary	Miocene	Tamiami formation	Creamy-white limestone, and greenish-gray clayey and calcareous marl locally hardened to limestone, silty and shelly sands, and shell marl. Upper part, where permeability is high, is only a few feet thick, and forms the lower part of Biscayne aquifer. Lower, and major part of the formation, is of low to very low permeability and forms the upper part of the Floridan aquiclude.	0-150
Tertiary	Miocene	Hawthorne formation	Sandy, phosphatic marl, interbedded with clay, shell marl, silt, and sand. Greenish colors predominate. Contains beds of flattened, well-worn quartzite and phosphate pebbles up to half an inch in greatest diameter. Water is generally scarce, of poor quality, and in the permeable beds is confined under low pressure head. Comprises the major part of the Floridan aquiclude.	50-500
Tertiary	Miocene	Tampa limestone	White to tan, soft to hard, often partially recrystallized limestone. Yields artesian water but not so freely as lower parts of the Floridan aquifer.	150-250
Tertiary	Oligocene	Suwanee limestone	Creamy, soft to hard limestone, similar lithologically to underlying Ocala limestone and often included with it in some earlier reports. With the Ocala, is part of the Floridan aquifer.	0-450
Tertiary	Eocene	Ocala limestone	White to cream, porous and cavernous to dense, in part cherty, in part highly foraminiferal, limestone. An excellent water-bearing formation, although the water is saline in large areas, especially south of Lake Okeechobee and along the Atlantic and Gulf coasts some distance northward. Principal component of the Floridan aquifer.	100-350
Tertiary	Eocene	Avon Park limestone	White to cream, foraminiferal limestone, with dark brown to tan crystalline to saccharoidal dolomite. Generally an excellent water-bearing formation and a part of the Floridan aquifer.	150-350
Tertiary	Eocene	Lake City limestone	Dark-brown dolomite and chalky limestone. Hydrologic characteristics imperfectly known. Probably a part of the Floridan aquifer.	200-250

Source: Modified from Parker, et al., (1955).

FIGURE 3.4



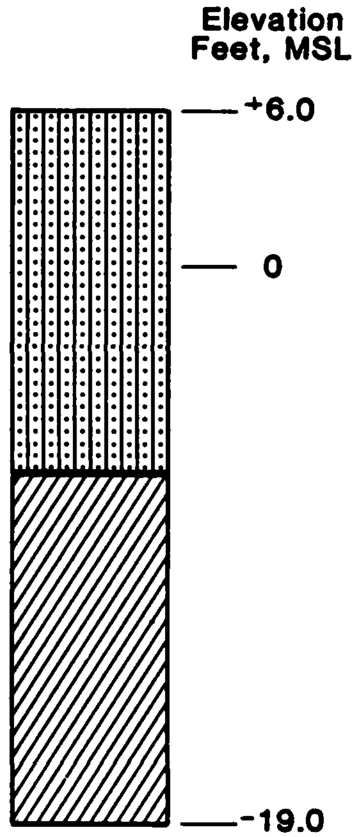
ES ENGINEERING-SCIENCE

FIGURE 3.5

HOMESTEAD AFB

LOG OF TEST BORING NO. 22

(Location shown on Figure 3.12)



LEGEND

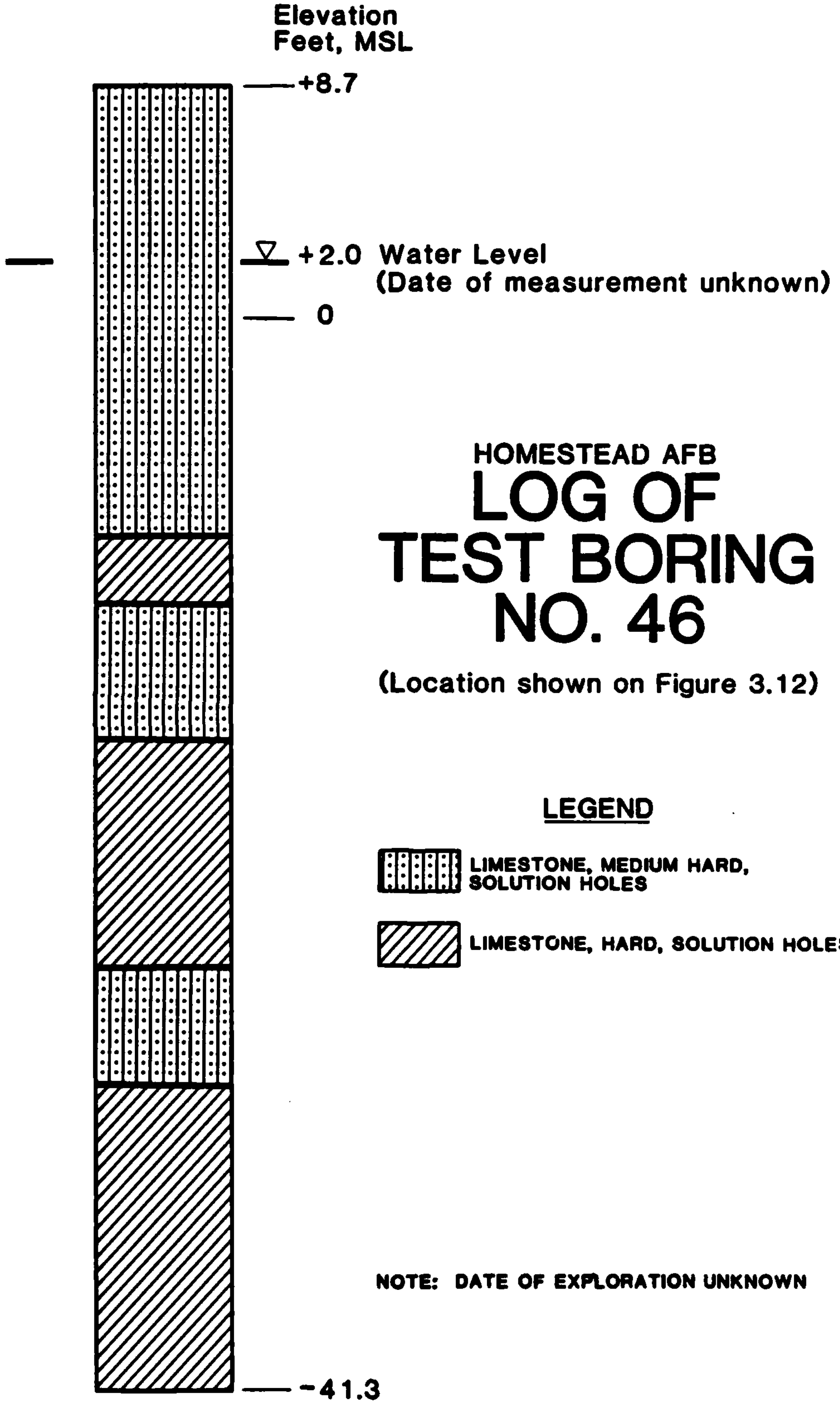
LIMESTONE, MEDIUM HARD, SOLUTION HOLES

LIMESTONE, HARD, SOLUTION HOLES

NOTES: DATE OF EXPLORATION UNKNOWN.
GROUND-WATER LEVEL NOT RECORDED.

SOURCE: HOMESTEAD AFB INSTALLATION DOCUMENTS

FIGURE 3.6



HOMESTEAD AFB

LOG OF TEST BORING NO. 46

(Location shown on Figure 3.12)

LEGEND

LIMESTONE, MEDIUM HARD, SOLUTION HOLES

LIMESTONE, HARD, SOLUTION HOLES

NOTE: DATE OF EXPLORATION UNKNOWN

SOURCE: HOMESTEAD AFB INSTALLATION DOCUMENTS

ES ENGINEERING - SCIENCE

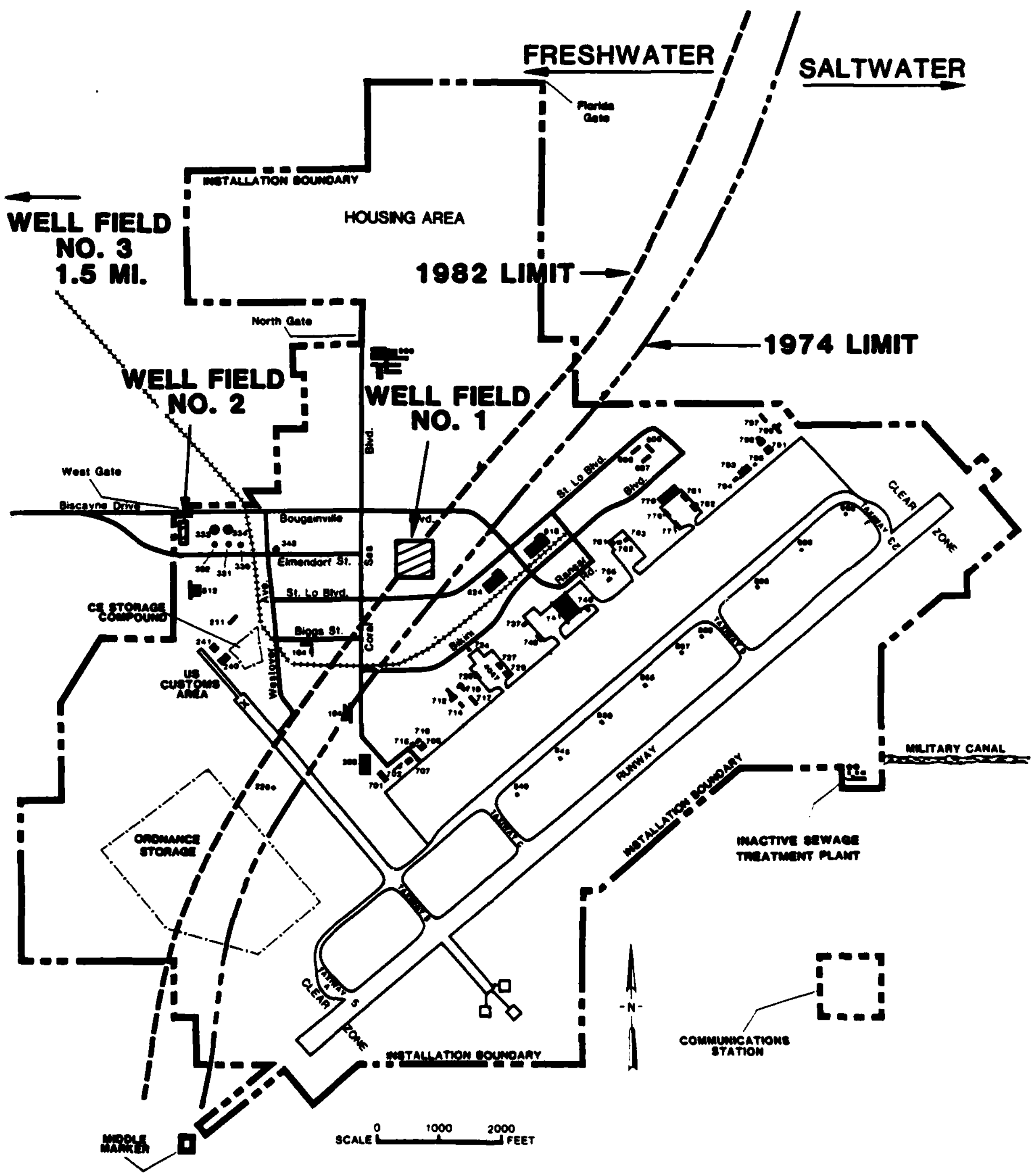
Introduction

The maintenance, operation and regulation of the hydrologic system within the study area falls under the dual jurisdictions of SFWMD and DERM. SFWMD, however, has been given regulatory responsibility. An extensive system of facilities including water conservation areas, canals, levees, control dams, pumping stations and spillways has been developed. This system permits the controlled drainage of interior areas, where natural water movement was minimal in the past. The water management system also permits the selective impoundment of water resources in accordance with a regional flood control project. Impoundment of water permits local flood control, water resource conservation, prevention against sea-water intrusion and sensitive ecological protection. Input to the SFWMD system comes in the form of precipitation falling on the region. Runoff, formerly trapped, is directed to the Everglades, which acts in a storage capacity, and then eastward in canals cut into the Biscayne Aquifer to the major population centers, terminating at Biscayne Bay. Wet-weather canal flow is permitted with little restriction to facilitate land area drainage. During storm periods, canals may be closed to preclude landward storm surges. During dry periods, selected canal control dams may be closed, thus maintaining a higher water level in interior areas than in exterior (Bay) areas.

This positive-head effectively limits salt water intrusion into adjacent canal reaches and continues aquifer recharge at a rate sufficient to prevent continuous ground-water quality degradation by saltwater intrusion into the Biscayne Aquifer. Because the SFWMD canal system conducts a consistent source of high-quality recharge to urban centers where demand for water resources is greatest, well fields are usually constructed in close proximity to major canals. In this manner, drawdowns in the ground-water levels are localized and large scale, potentially harmful effects are negated. The primary canal system follows natural drainage alignments, while the secondary canals were excavated along a grid pattern to supplement the major canals. Figure 3.7 depicts the stabilized salt water intrusion limit at the base of the Biscayne Aquifer. The Military Canal, which receives runoff from

FIGURE 3.7

HOMESTEAD AFB
LIMIT OF SALT WATER INTRUSION (1000 mg/l) at Base of Biscayne Aquifer



NOTE: BUILDING NUMBERS ARE LOCATED ADJACENT TO BUILDING SITES

SOURCE: KLEIN, (1983 Interview)

ES ENGINEERING-SCIENCE

Homestead Air Force Base, is not a part of the South Florida Water Management District and is not connected to the nearby L-31E "borrow canal." According to DERM (1978), surface water management south of the Military Canal could be doubtful due to the constant threat of a hurricane storm surge, made possible by low land surface elevations and proximity to the coastline.

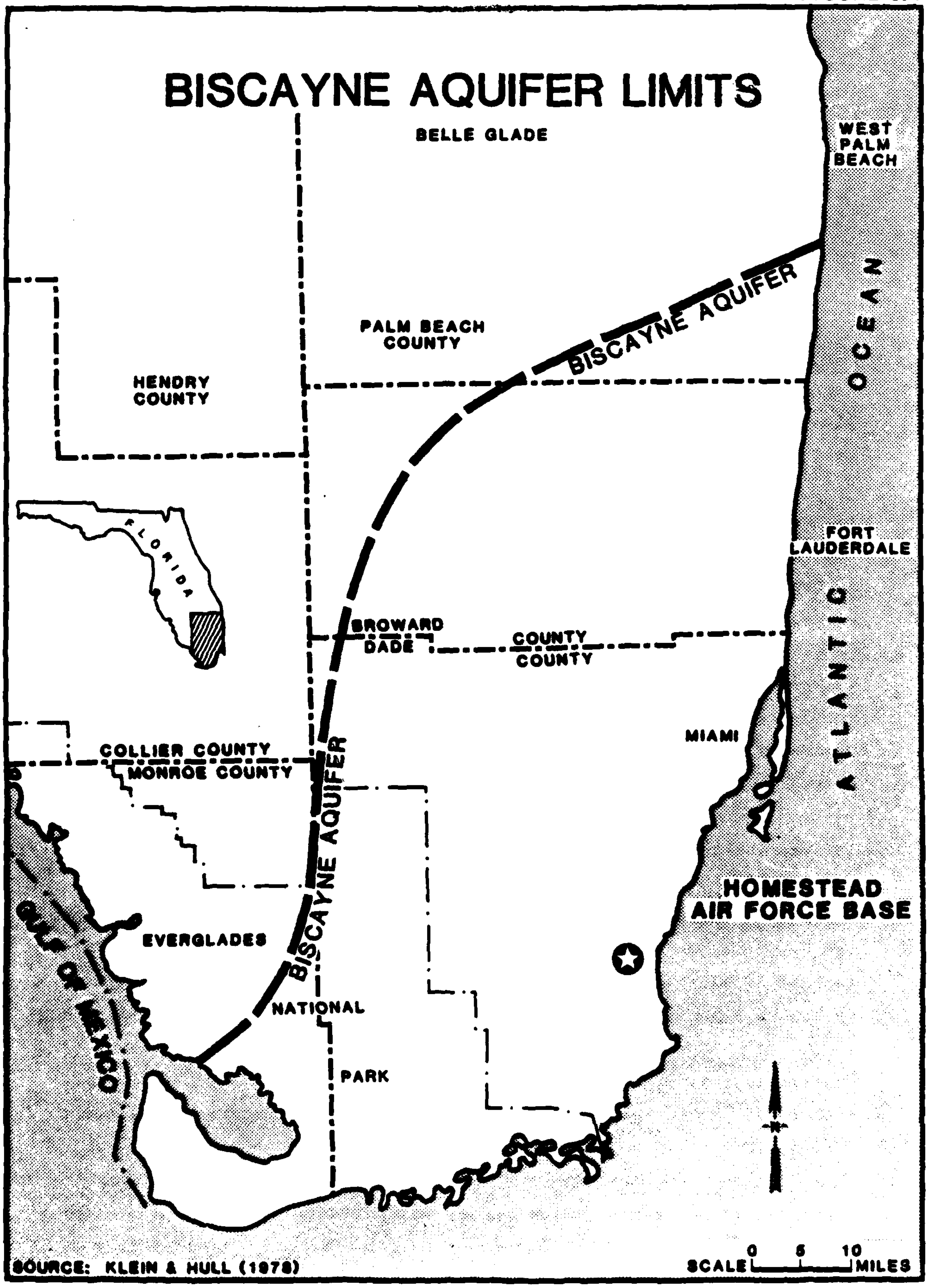
Dade County DERM has primary responsibility for monitoring of water quality in the IRP study area. DERM performs monthly water quality monitoring at 192 inland canal stations. In 1980, a program was instituted to protect ground-water resources because of the close relationship that was established between land use and local ground-water quality. Studies indicated that the type of use and utilization intensity impacted water quality, and also that some attenuation of pollutants could occur that might renovate water quality. This resulted in the Well Field Protection Ordinance (WFPO), a zoning plan administered by DERM that regulates land use around water supply wells as a function of ground-water travel time to those same wells. For example, certain types of industrial development may be prohibited if their construction was contemplated within a zone where travel times to pumping wells was considered to be too brief to allow attenuation or dispersion of contaminants, should they be spilled or leak from treatment, storage or disposal (TSD) facilities. The WFPO underscores the extreme sensitivity of the Biscayne aquifer to degradation and the high degree of concern for continued protection of the aquifer.

Biscayne Aquifer

Homestead Air Force Base lies within the limits of the Biscayne Aquifer, designated under the Safe Drinking Water Act as the "single source" of water supplies for that portion of southern Florida depicted on Figure 3.8. A single source aquifer is the only reasonably available source of potable water to a significant segment of the population, as determined under the provisions of Sections 17-3403 (5) and (6), F.A.C. Municipal, industrial, domestic and agricultural consumers derive their supplies from this aquifer.

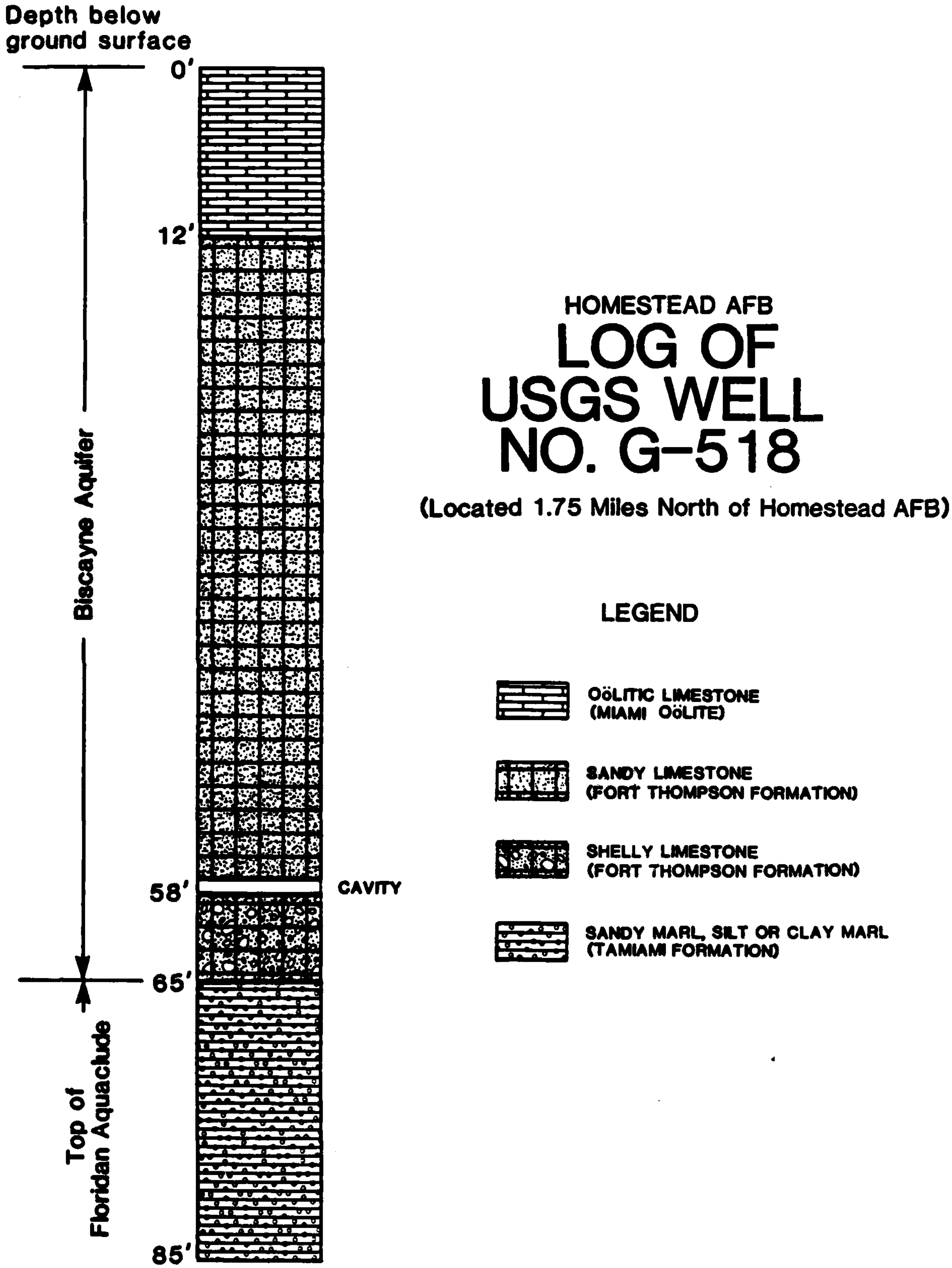
In the Homestead Air Force Base area, the Biscayne Aquifer is comprised of a 12-foot thickness of Miami Oölite overlying a 53-foot thick section of the Fort Thompson Formation (section measured at USGS

FIGURE 3.8



ES ENGINEERING-SCIENCE

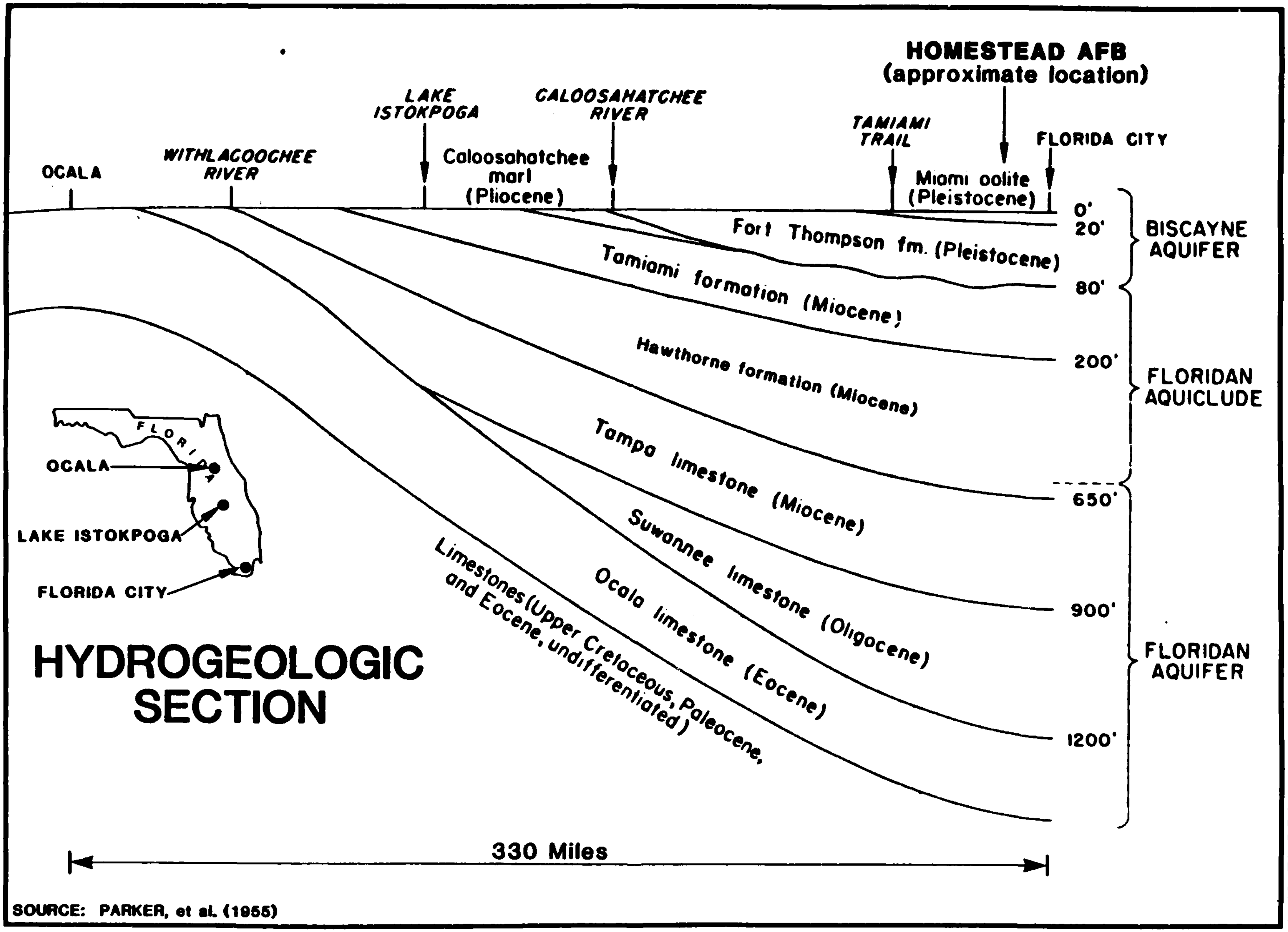
FIGURE 3.9



SOURCE: MODIFIED FROM PARKER, et al, (1955)

ES ENGINEERING-SCIENCE

FIGURE 3.10



ES ENGINEERING-SCIENCE

Well G-518, Figure 3.9). The two highly permeable geologic units are in communication and are not known to be separated by an impermeable stratum such as a clay layer. The log of USGS Well G-518 is presented as Figure 3.9 and graphically depicts the relationships of geologic units forming the Biscayne Aquifer. As shown in Figure 3.10, a hydrogeologic section, the Biscayne Aquifer is wedge-shaped, beginning at a feather-edge west of the IRP study area in the Everglades, thickening to some 200 feet in coastal Broward County. At Homestead Air Force Base, the Biscayne Aquifer extends from ground surface to an approximate depth of 70 feet (interpolated from Parker, et al., 1955, Plate 7, Cross-section B-B').

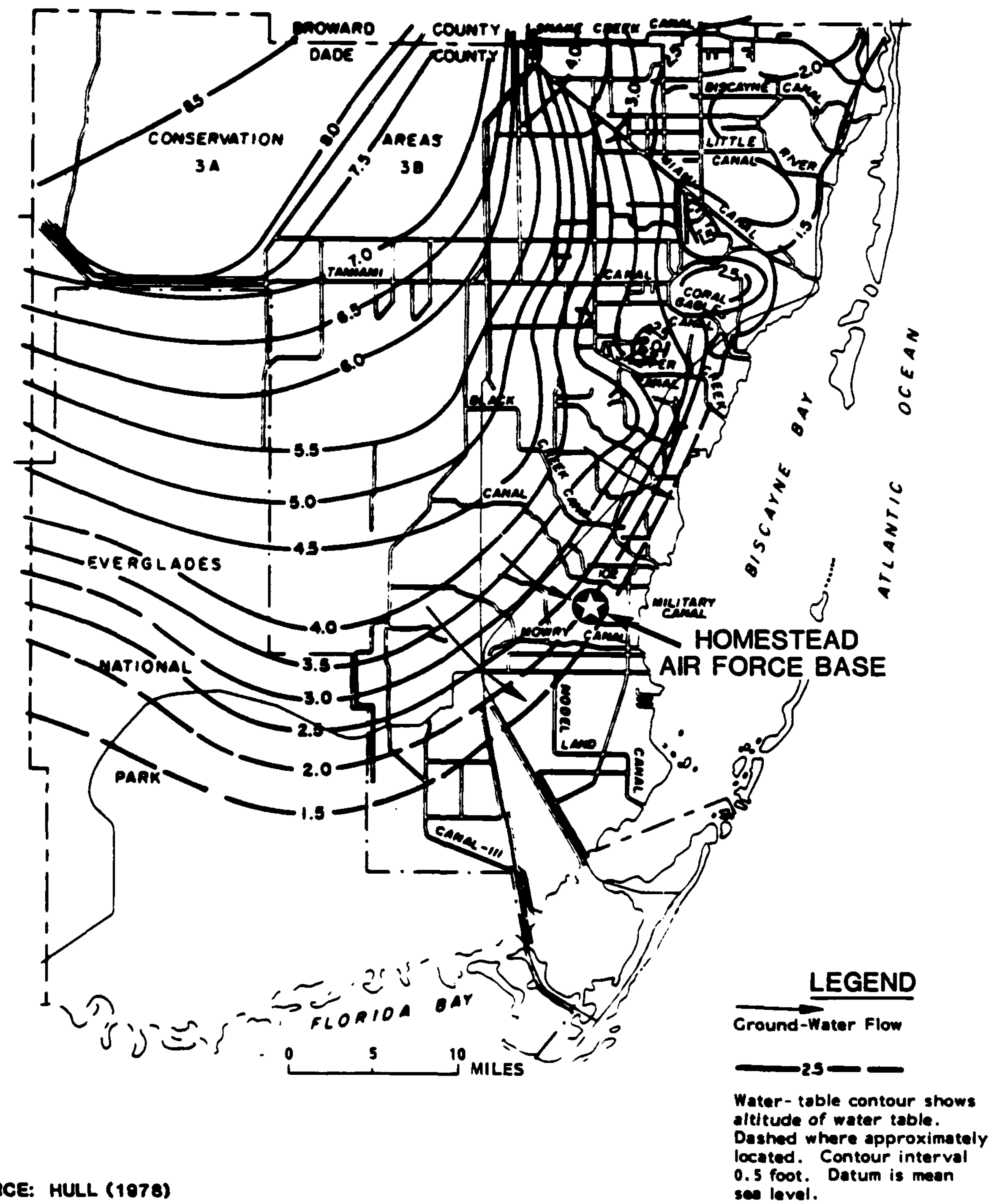
Ground water occurs under water table (unconfined) conditions in the numerous interconnecting pores, slots, channels and solution cavities present in the limestones, sandstones and sands that form the Biscayne. Klein and Hull (1978) report that the Biscayne is capable of producing large quantities of water due to high horizontal and vertical permeabilities, transmissivity, storativity and the efficient management program that the Biscayne system enjoys. The aquifer is recharged by precipitation falling on the outcrop area (in this case, its entire areal extent). Some dry weather recharge is furnished by canals flowing through the aquifer's exposure. Schroeder et al., (1958) reported the amount of recharge to be 38 inches, or 63 percent of total rainfall. Homestead AFB lies with the recharge zone of the Biscayne Aquifer.

Ground-water levels within the Biscayne system are usually high, i.e., close to ground surface. According to data recorded at USGS monitoring well G-1183 (located just east of Building 701, Homestead AFB), ground-water levels have ranged from one foot below ground surface (9 June 1966) to six feet deep (12 May 1971). The ground surface elevation at observation well G-1183 is reported to be five feet MSL (Hull, 1978).

Regional ground-water flow directions tend to change slightly on a seasonal basis in the vicinity of Homestead AFB. During wet seasons, when ground-water flow is highest, flow in the Biscayne is generally east, to Biscayne Bay. Dry season, low-water levels create southeasterly flow in the Biscayne with respect to Homestead AFB, which also terminates at Biscayne Bay. Figure 3.11 depicts typical (average)

FIGURE 3.11

BISCAYNE AQUIFER AVERAGE WATER LEVELS and FLOW DIRECTIONS, 1960–1975



SOURCE: HULL (1978)

ES ENGINEERING-SCIENCE

ground-water levels and flow directions for the Homestead Air Force Base study area.

According to DERM (1978a, 1978b) Hull (1978, 1982) and several other sources, the quality of water resources derived from the Biscayne Aquifer is generally good. The notable exceptions include the well-documented salt-water intrusion problem which occurs along coastal reaches of Broward and Dade counties (refer to Hull and Meyer, 1973; Klein and Hull, 1978; SFWMD, 1978; and several others). Salt water has been an historical problem as intrusion occurs when fresh water resources are over-exploited. The result is that salt water migrates into formerly fresh water zones, as a wedge contaminating lower portions of an aquifer first, and finally, if left unchecked, will contaminate the entire aquifer zone. Water resource management, such as that currently practiced in South Florida, can effectively control salt-water intrusion by maintaining adequate water supplies for consumptive use, allowing a consistent "outflow" of fresh water from the system, thus precluding salt-water inflow. The second major potential impact to Biscayne Aquifer water quality may be due to improper waste management. Several cases have been documented (Klein and Hull, 1978; DERM, 1978a; Yoder, 1982) where ground-water quality had been degraded locally due to leakage, spills or leachate migration from treatment, storage or disposal facilities. In fact, the aquifer itself has been designated as a Superfund study site by EPA.

Floridan Aquifer

The Biscayne Aquifer is underlain by the Floridan Aquiclude which is composed of the Tamiami and Hawthorne Formations (refer to Table 3.3). The lithology of the Florida Aquiclude includes hard limestone, marl, silty shelly sands and phosphatic marl interbedded with clay. Taken together these materials from a relatively tight, nearly impermeable layer some 700 feet thick in the study area. Immediately beneath the aquiclude is the Floridan Aquifer, which in the study area is composed of the Tampa, Suwanee, Ocala, Avon Park and Lake City Limestones. Although prolific, the Floridan is not normally used for water resource exploitation in the Dade County area due to naturally mineralized water, depth to the aquifer and the fact that better quality water is available from the Biscayne Aquifer at considerably shallower depths. Upper

sections of the Floridan Aquifer which are not highly mineralized may be reserved for fresh water storage or use by pretreatment/desalinization, if future consumer demands ever exceed Biscayne Aquifer production capability. At present, the Biscayne is not being exploited beyond its useful capacity. Lower sections of the Floridan are highly mineralized and of no use. According to Garcia-Bengochea (1970) the entire section of Floridan Aquifer beneath Miami is contaminated by high chloride levels. The upper Floridan was reported to contain 900 mg/l chloride (Suwanee Limestone). Chloride contamination was reported to increase with depth to a maximum of 19,300 mg/l in the Oldsmar Limestone which forms the base of the Floridan at a depth of 2960 feet below ground surface. Deep well injection disposal of industrial and municipal wastes into deep zones of the Floridan system has been permitted in past years.

Installation Wells

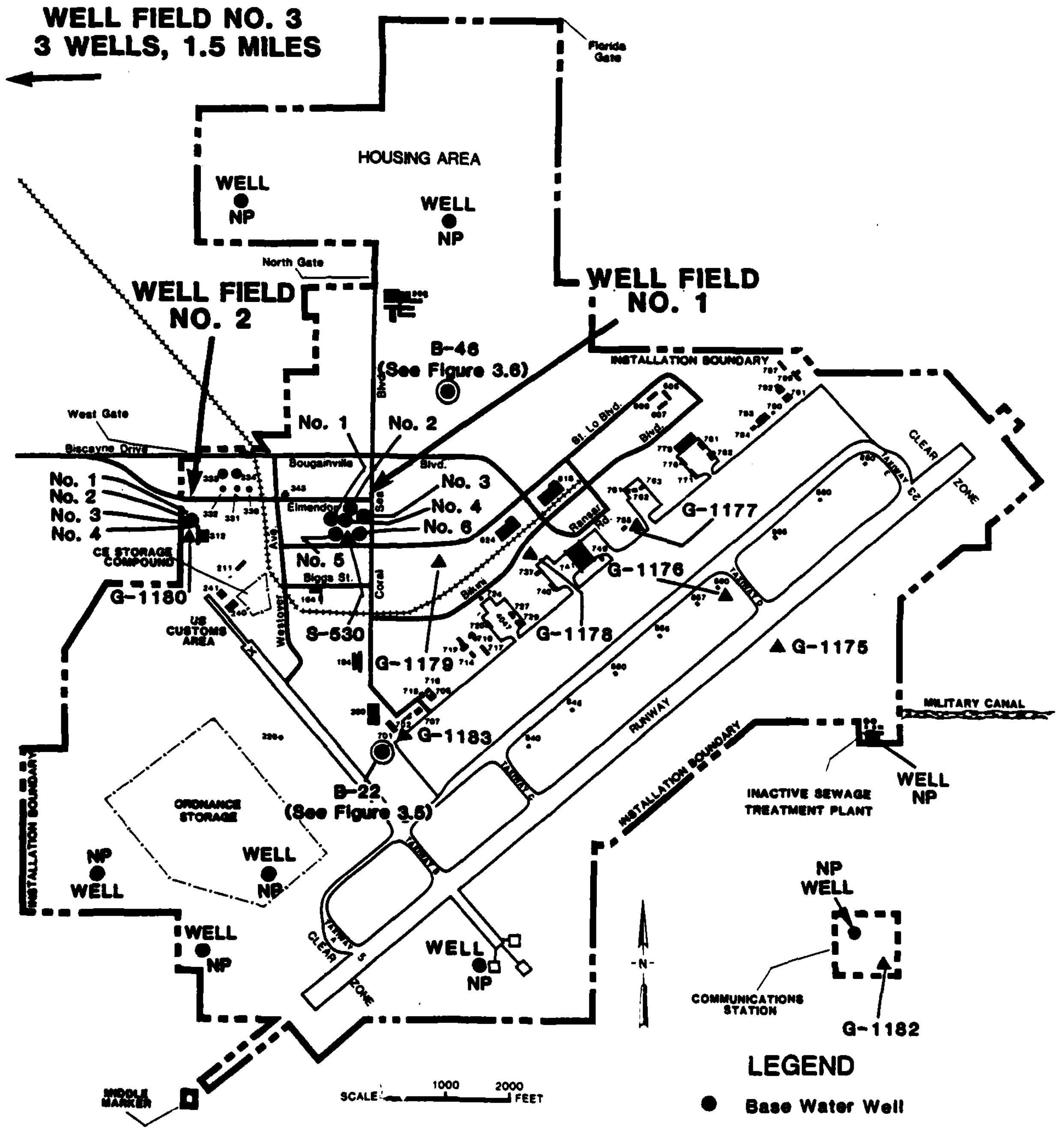
Homestead Air Force Base obtains its water resources from ten wells constructed on the installation. Three additional supply wells have recently been drilled at a site immediately west of Homestead AFB. All installation water supply wells have been screened into the Biscayne Aquifer. According to base documents, installation wells have been constructed as follows:

a. Well Field No. 1 - six wells, 8-inch diameter, 72-feet deep, 2900 gpm total capacity
b. Well Field No. 2 - two wells, 8-inch diameter, 70-feet deep,
   - two wells, 16-inch diameter, 70-feet deep,
   capacity: 8 in: 300 gpm; 16 in: 1000 gpm
c. Well Field No. 3 - three wells, construction data unavailable
   permitted capacity: 710 gpm

In addition to the wells listed above, seven non-potable local service wells are known to exist at Homestead Air Force Base. Construction information describing these wells is not on file. The locations of all base water supply wells and USGS observation wells are shown on Figure 3.12.

FIGURE 3.12

HOMESTEAD AFB
BASE WELL LOCATIONS



LEGEND

- ● Base Water Well
- ▲ USGS Observation Well
- ◉ Test Boring
- NP Non-Potable

NOTE: BUILDING NUMBERS ARE LOCATED ADJACENT TO BUILDING SITES

SOURCE: HOMESTEAD AFB INSTALLATION DOCUMENTS

ES ENGINEERING-SCIENCE

Satellite Facility Water Sources

Homestead Air Force Base satellite and remote support facility activities derive water supplies from the following sources:

Site	Mission	Water Source
Richmond AFS	Radar Site	Purchased
Homestead Survival Annex	Sea Survival School	Purchased
Homestead Communications Station	Radio Transmitter	Air Force Well (Non-potable)
Cudjoe Key	Communications Site	Navy Aqueduct
Bib Knot Key	Communications Site	Navy Aqueduct
Homestead Helicopter Annex	Helicopter Pad	No Water Requirement
Homestead Dock Annex	Boat Launch Facility	Purchased
Homestead Middle Marker	Navigation Aid	No Water Requirement
Key Largo	Communications Site	Navy Aqueduct

Ground-Water Quality

The base wells are monitored for water quality on a routine basis. The only significant problem concerns the intrusion of salt water along the base of the Biscayne Aquifer within the IRP study area (Figure 3.7). This intrusion has forced the partial curtailment of pumping for Well Field No. 1, the addition of Well Field No. 3 and the monitoring for chloride intrusion at the U.S. Geological Survey observation wells shown on Figure 3.12. According to Klein (1983 interview), the 1000 mg/l isochlor used to define the limit of salt water intrusion, has remained stationary beneath Homestead AFB since 1981 and proper water management practices have stabilized the "salt water line" and that no further aquifer loss will occur, provided that adequate resource management continues.

Surface Water Quality

All surface drainage from the base is directed to the Military Canal, a Class III Surface Water as determined by FDER. Class III waters are reserved for recreation and the propagation and management of fish and wildlife resources. Surface water quality monitoring has historically been performed along two major diversion channels at the bar screen locations, in the storm water reservoir and the Military Canal. From 1955 through March 1983, the sewage treatment plant discharged to the Military Canal. The sewage treatment plant influent and effluent has also

been monitored. Homestead Air Force Base surface water quality monitoring locations are shown on Figure 3.13.

Historically, sewage treatment plant effluent impacted Military Canal water quality as elevated levels of BOD, phosphate-phosphorus and coliform levels were observed (DERM, 1978). The quality of Military Canal water is expected to improve after March 1983 as a result of Homestead Air Force Base joining the South Dade County Regional Sewage Treatment Plant and no longer discharging sewage treatment plant effluent to Military Canal (Yoder, 1983 interview).

A review of surface water quality monitoring data indicates that both the storm water reservoir and the Military Canal monitoring points have periodically shown elevated levels of copper, iron and zinc. Analytical data for these two monitoring points is included in Appendix D, Tables D.2 through D.5.

Endangered Species

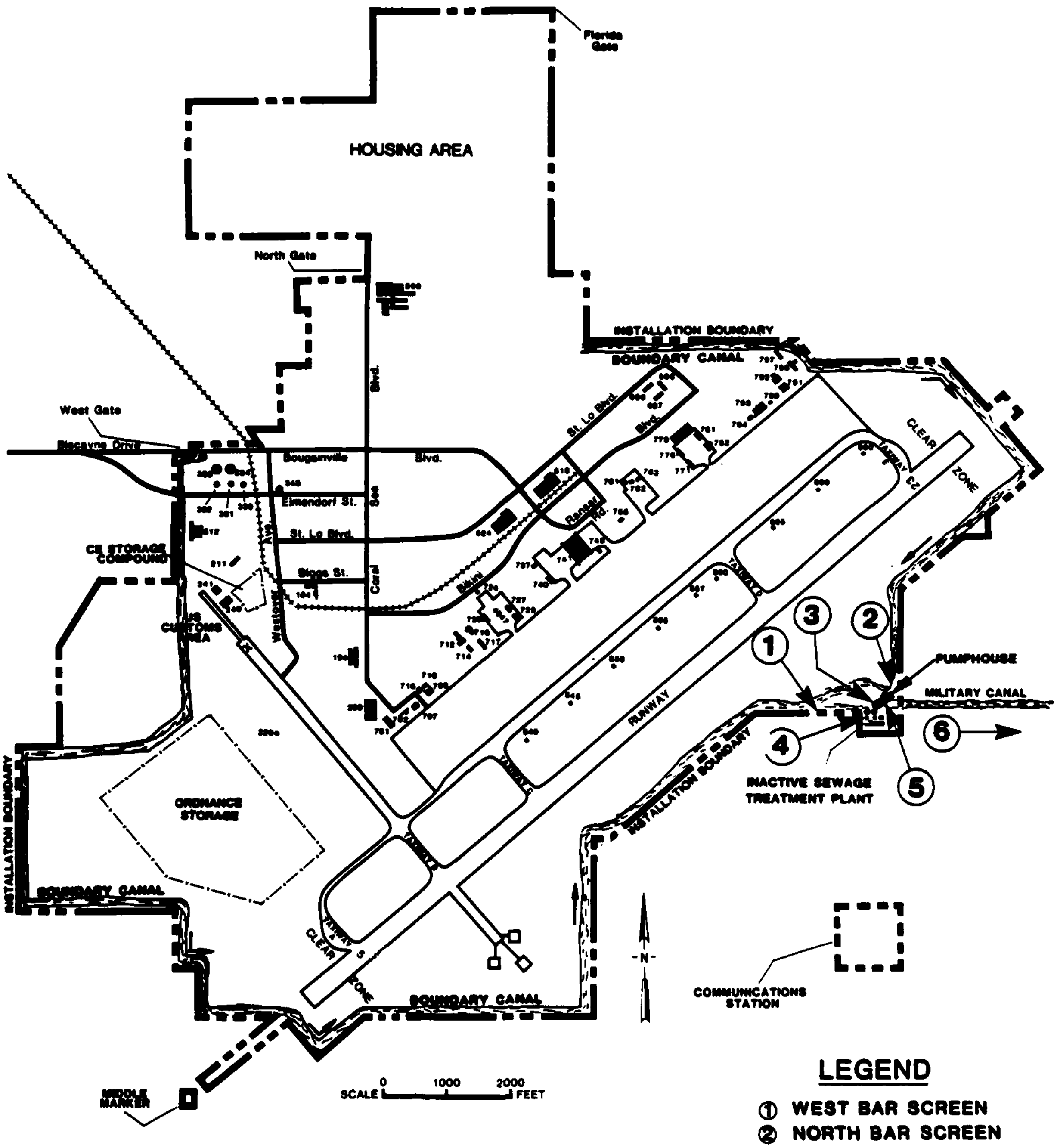
There are no known endangered species that have been identified at Homestead AFB. The American alligator and the Eastern Indigo snake, both threatened species, have been located on the base.

ENVIRONMENTAL SUMMARY

The environmental setting data reviewed for this investigation indicate the following major items that are relevant to the evaluation of past waste management practices at Homestead Air Force Base:

- Mean annual precipitation is 57.9 inches. Net precipitation has been calculated to be 6.4 inches.
- The drainage of runoff (leaving the base) and runon (entering the base) is controlled primarily by the Boundary Canal and its exterior dike, respectively. The canal and dike surround most of the base. Surface drainage from the installation flows to the Boundary Canal and discharges to Biscayne Bay by way of Military Canal, a Class III surface water.
- Installation surface soils tend to be thin, permeable or completely absent. Rockdale Limestone soils are exposed over sixty percent of the base land area. Soil units exposed at the base possess high infiltration rates.

HOMESTEAD AFB
BASE SURFACE WATER SAMPLING LOCATIONS



LEGEND

1. WEST BAR SCREEN
2. NORTH BAR SCREEN
3. RESERVOIR
4. INFLUENT, STP
5. EFFLUENT, STP
6. MILITARY CANAL

NOTE: BUILDING NUMBERS ARE LOCATED ADJACENT TO BUILDING SITES

SOURCE: HOMESTEAD AFB INSTALLATION DOCUMENTS

- The primary regional aquifer, the Biscayne, underlies Homestead Air Force Base. The highly permeable Miami Oölite, which forms the upper portion of the Biscayne Aquifer, is frequently exposed at ground surface and along the entire Boundary Canal alignment.
- The base lies within the recharge zone of the Biscayne Aquifer, a single source aquifer. Annual recharge is estimated to be as much as 38 inches, or 63 percent of total rainfall. Consequently, Biscayne Aquifer water levels are very high, ranging from one to six feet below ground surface (at USGS observation well G-1183).
- Salt water intrusion has been shown to be a major threat to the quality of ground water. The implementation of ground-water resource conservation measures have stabilized the "salt water line", which passes beneath Homestead Air Force Base.
- Flooding due to a major storm surge may be a problem at Homestead AFB.
- One hundred acres of base land have been identified as wetlands.
- No known endangered species exist on Homestead AFB. Two threatened species, the American alligator and the Indigo snake, are present on base.

From these major points, it may be seen that the potential for the generation and migration of waste-related contamination from past management practices exists. The sensitivity of the Biscayne Aquifer to contamination has been well documented. If hazardous materials are present in or on ground surface, they will likely follow a short vertical path to the shallow ground water level present within the upper Biscayne Aquifer (Miami Oölite). Most contaminants transported within the Biscayne Aquifer would likely move eastward with the regional ground-water system, unless local flow is modified by pumping wells. In this case, if any contaminants were present, they could be drawn into the wells. Floating contaminants, i.e., fuel, oil, would likely be intercepted by the Boundary Canal.

Flooding due to a significant storm surge is possible at Homestead AFB. Such flooding (100-year event) could mobilize contaminants from disposal areas where they have been placed.

CHAPTER 4
FINDINGS

This chapter summarizes the hazardous waste generated by activity; describes waste disposal methods; identifies the disposal sites located on the base; and evaluates the potential for environmental contamination. To assess hazardous waste management at Homestead Air Force Base, past activities of waste generation and disposal methods were reviewed.

REMOTE ANNEXES REVIEW

A review of files and records and interviews with present and past base employees were carried out to identify past activities at the annexes which could have resulted in the disposal of hazardous waste. Those sites in the vicinity of the base were surveyed aerially. None of the remote base annexes were found to have significant waste generation or disposal activities, past or present.

PAST SHOP AND BASE ACTIVITY REVIEW

A review was conducted of current and past waste generation and disposal methods to identify base activities that resulted in the generation and subsequent disposal of hazardous waste. This activity consisted of a review of files and records, interviews with base employees, and site inspections.

The source of most hazardous wastes on Homestead AFB can be associated with one of the following activities:

- Industrial Operations (Shops)
- Activities Conducted During Period of Base Inactivity
- Pesticide Utilization
- Fire Protection Training
- Liquid Fuels Management
- Storage Areas

The following discussion addresses only those wastes generated on Homestead AFB which are either hazardous or potentially hazardous. In this discussion a hazardous waste is defined by the Comprehensive Environemntal Response, Compensation, and Liability Act of 1980 (CERCLA). A potentially hazardous waste is one which is suspected of being hazardous, although insufficient data are available to fully characterize the material.

Industrial Operations (Shops)

During the 1942 to 1946 period, and resuming in 1954 to the present, industrial operations (shops) at Homestead AFB have included maintenance activities to support aircraft flying missions. These shops maintained and repaired components and parts of aircraft and ground equipment. A list of industrial shops was obtained from the Bioenvironmental Engineering Service's (BES) files. Information contained in the files indicated those shops which generate hazardous waste and/or handle hazardous materials. A summary review of the shop files is shown in Appendix E, Master List of Industrial Shops.

For those shops that generated hazardous waste, key personnel within the base maintenance support functions were interviewed. A timeline of disposal methods was established for major wastes generated. The information from interviews with base personnel and base records has been summarized in Table 4.1. This table presents a list of building locations as well as the waste material names, waste quantities, and disposal method timeline. Many of the disposal methods are based on speculative information derived from personnel currently at the base. The waste quantities shown in Table 4.1 are based on estimates given by shop personnel at the time of the interviews. The shops that have generated insignificant quantities or no hazardous waste are not listed in Table 4.1.

During the 1942 to 1946 period and again from 1954 until the mid-1970's, most combustible wastes generated at the various facilities throughout the base were taken to the Fire Training Area to be used for fire protection training exercises. More recently these wastes have been sold to an off-base contractor. Waste engine oils have been purchased by contractors intermittantly at least since the mid-1960's.

TABLE 4.1

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1940 1950 1960 1970 1980
31st AIRCRAFT GENERATION SQUADRON				
AIRCRAFT MAINTENANCE UNITS	730, 717, 733, 714	WASTE OIL	200 GALS./MO.	1955 FPTA 2 → DPDO
31st COMPONENT REPAIR SQUADRON				
WEAPONS CONTROL SYSTEM CALIBRATION DOCK	761, 762	PD-680	2 GALS./MO.	STORM DRAIN 1980 NOT USED
		METHYL CHLOROFORM	1 PT./MO.	STORM DRAIN NOT USED
ELECTRICAL/BATTERY SHOP	745	BATTERY ACID	80 GALS./MO.	1942 1946 NEUTRALIZED/SANITARY SEWER
		WASTE OIL	10 GALS./MO.	FPTA 2 → DPDO
ENGINE SHOP	750	WASTE OIL	50 GALS./MO.	FPTA 1; OIL/WATER SEPARATOR/SANITARY SEWER
		HYDRAULIC FLUID	50 GALS./MO.	FPTA 1; FPTA 2 → DPDO
		PD-680	10 GALS./MO.	FPTA 1; FPTA 2 → DPDO
JET ENGINE TEST STANDS	253, 254, 268	WASTE OIL	50 GALS./MO.	OIL/WATER SEPARATOR/SANITARY SEWER
MACHINE SHOP	745	WASTE OIL	< 5 GALS./MO.	FPTA 1; FPTA 2 → DPDO
NDI LAB	755	WASTE OIL	<20 GALS./MO.	FPTA 2 → DPDO
		PENETRANTS & EMULSIFIERS	< 5 GALS./MO.	SANITARY SEWER
PMEL	784	MERCURY	1 QT./YR.	1960 DPDO
PNEUDRAULIC SHOP	745	PD-680	5 GALS./MO.	FPTA 2 → DPDO
TRIM PAD/SOUND SUPPRESSORS	4064-4067	WASTE JP-4	200 GALS./MO.	FPTA 2 → FPTA 3

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FPTA = FIRE PROTECTION TRAINING AREA

DPDO = DEFENSE PROPERTY DISPOSAL OFFICE

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1940 – 1950 – 1960 – 1970 – 1980)
31st EQUIPMENT MAINTENANCE SQUADRON				
AGE SHOP	763	PD-680	50 GALS./MO.	1942 FPTA 1 1946; [illegible] SANITARY SEWER
		WASTE FUELS/OIL	600 GALS./MO.	FPTA 1; FPTA 2, DPDO
ARMAMENT	740	PD-680	10 GALS./MO.	FPTA 1; FPTA 2, DPDO
CORROSION CONTROL	720	RINSATE	30 GALS./MO.	FPTA 1; FPTA 2, SANITARY SEWER
		MEK	5 GALS./MO.	FPTA 1; FPTA 2, DPDO
		THINNERS & STRIPPERS	100 GALS./MO.	FPTA 2, DPDO
EGRESS SHOP	741	PD-680	5 GALS./MO.	FPTA 2, DPDO
MISSILE MAINTENANCE SHOP	251	PD-680	<5 GALS./MO.	[illegible] ONTO GROUND, DPDO
MUNITIONS EQUIPMENT MAINTENANCE	284	PD-680	<5 GALS./MO.	FPTA 2, FPTA 3, DPDO
		OIL/BRAKE FLUIDS/SOAPS	QUANTITY NOT AVAILABLE	SANITARY SEWER
PHASE INSPECTION	741	JP-4	<10 GALS./MO.	DRUMMED/TO AGE FOR REUSE
		WASTE OIL	4 GALS./MO.	FPTA 2, FPTA 3, DPDO
WHEEL AND TIRE SHOP	750	PD-680 & PAINT STRIPPER	160 GALS./MO.	1942 FPTA 1 1946; FPTA 2, FPTA 3, DPDO

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FPTA = FIRE PROTECTION TRAINING AREA

DPDO = DEFENSE PROPERTY DISPOSAL OFFICE

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1940 – 1950 – 1960 – 1970 – 1980)
31st SUPPLY SQUADRON				
FUEL LAB	716	POTASSIUM CHROMATE	< 1 GAL. /MO.	1955 DRAIN TO SANITARY SEWER
		SULFURIC ACID	< 1 GAL. /MO.	DRAIN TO SANITARY SEWER
31st TRANSPORTATION SQUADRON				
ALLIED TRADES	312	WASTE PAINT THINNERS	<5 GALS. /MO.	1942 FPTA 1 1946; FPTA 2; DPDO
REFUELING MAINTENANCE	711	WASTE OIL	40 GALS. /MO.	FPTA 1; FPTA 2; DPDO
TIRE AND BATTERY SHOP	312	BATTERY ACID	100 GALS. /MO.	NEUTRALIZED/SANITARY SEWER
		WASTE OIL	80 GALS. /MO.	FPTA 1; FPTA 2; DPDO
		OLD BATTERIES	15 BATT. /MO.	DPDO; DPDO
VEHICLE MAINTENANCE	312	PD-680	55 GALS. /MO.	FPTA 1; FPTA 2; DPDO
		WASTE OIL & FLUIDS	300 GALS. /MO.	FPTA 1; FPTA 2; DPDO
		BATTERY ACID	100 GALS. /MO.	NEUTRALIZED/SANITARY SEWER
		OLD BATTERIES	15 BATT. /MO.	DPDO; DPDO
USAF HOSPITAL				
BASE DENTAL CLINIC	686	PHOTOCHEMICALS	35 GALS. /MO.	SANITARY SEWER
		PHOTOFIXER	30 GALS. /MO.	SANITARY SEWER; TO MEDICAL X-RAY LAB FOR SILVER RECOVERY

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FPTA = FIRE PROTECTION TRAINING AREA

DPDO = DEFENSE PROPERTY DISPOSAL OFFICE

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1940 1950 1960 1970 1980
USAF HOSPITAL (cont'd)				
DENTAL/ORAL SURGERY	990	PHOTOCHEMICALS	10 GALS./MO.	1942 1946 1955 SANITARY SEWER
		PHOTOFIXER	8 GALS./MO.	SANITARY SEWER; TO MEDICAL X-RAY LAB FOR SILVER RECOVERY
MEDICAL X-RAY	990	PHOTOCHEMICALS	250 GALS./MO.	SANITARY SEWER
		PHOTOFIXER	200 GALS./MO.	SANITARY SEWER; SILVER TO DPDO
31st COMBAT SUPPORT GROUP				
BASE PHOTO LAB	101	PHOTOCHEMICALS	30 GALS./MO.	SANITARY SEWER
		PHOTOFIXER	20 GALS./MO.	SANITARY SEWER; SILVER TO DPDO
SMALL ARMS TRAINING	116	RIFLE BORE CLEANING RAGS	<1 LB./MO.	DUMPSTER
MORALE, WELFARE AND RECREATION				
AUTO HOBBY SHOP	204	WASTE OIL	300 GALS./MO.	MWR CONTRACTOR
31st CIVIL ENGINEERING SQUADRON				
ENTOMOLOGY SHOP	371	WASTE (EXCESS) PESTICIDE	30 GALS./MO.	LAND DISPOSAL; DPDO
		EMPTY PESTICIDE CONTAINERS	<20/MO.	DUMPSTER

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FPTA = FIRE PROTECTION TRAINING AREA

DPDO = DEFENSE PROPERTY DISPOSAL OFFICE

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1940 1950 1960 1970 1980
31st CIVIL ENGINEERING SQUADRON (cont'd)				
EXTERIOR ELECTRIC	164	PCB TRANSFORMERS	OCCASIONAL	1942 1946 1955 DPDO
FIRE DEPARTMENT	706	WASTE PETROLEUM PRODUCTS	<20 GALS./MO.	FPTA 1; FPTA 2; DPDO
FIRE EXTINGUISHER MAINTENANCE	550	EXCESS CHEMICALS	< 1 GAL./MO.	SANITARY SEWER
GOLF COURSE MAINTENANCE	2204	AMMONIUM HYDROXIDE	< 1 LB./MO.	SURFACE DRAINAGE
		WASTE OIL	<5 GALS./MO.	FPTA 2; DPDO
GROUNDS SHOP	181	WASTE OIL	<5 GALS./MO.	FPTA 1; FPTA 2; DPDO
HEATING SHOP	121	WASTE OIL	<5 GALS./MO.	FPTA 1; FPTA 2; FPTA 3
		MORPHALINE ACID	5 LBS./MO.	SANITARY SEWER
HEAVY EQUIPMENT MAINTENANCE	180	WASTE OIL	250 GALS./MO.	FPTA 1; FPTA 2; DPDO
LIQUID FUEL MAINTENANCE	121	TANK CLEANING SLUDGE	20 DRUMS/5 YRS.	WEATHERED IN POL DIKE AREA; STORAGE/AWAITING OFF-BASE DISPOSAL
PAINT SHOP	174	EMPTY PAINT CANS	150 CANS/MO.	DUMPSTER
PLUMBING SHOP	176	POWDERED CHLORINE (HTH)	2 GALS./YR.	RINSED TO SANITARY SEWER
POWER PRODUCTION	176	WASTE OIL/LUBE OIL	100 GALS./MO.	FPTA 1; FPTA 2; DPDO
		BATTERY ACID	30 GALS./MO.	NEUTRALIZED/SANITARY SEWER

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FPTA = FIRE PROTECTION TRAINING AREA

DPDO = DEFENSE PROPERTY DISPOSAL OFFICE

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1940 1950 1960 1970 1980
31st TTW, DCO				
PHOTO LAB	799	PHOTOCHEMICALS & FIXER	10 GALS/MO.	1960 SANITARY SEWER/SILVER RECOVERY TO DPDO
40th ARRS, 1st DET				
HELICOPTER MAINTENANCE	791	PETROL. PRODUCTS/SYNTHOIL	15 GALS./MO.	FPTA 2 — DPDO
301st ARRS				
AVIONICS AGE	739	WASTE OIL	50 GALS./MO.	FPTA 2 — DPDO
CORROSION CONTROL SHOP	792	MEK	1 GAL./MO.	FPTA 2 — DPDO
ENGINE SHOP	792	WASTE OIL	10 GALS./MO.	FPTA 2 — DPDO
		HYDRAULIC OIL	5 GALS./MO.	FPTA 2 — DPDO
		SOLVENTS	10 GALS./MO.	FPTA 2 — DPDO
C-130 MAINTENANCE	790	PD-680	20 GALS./MO.	FPTA 2 — DPDO
HH 3-E MAINTENANCE	776	WASTE OIL	100 GALS./MO.	FPTA 2 — DPDO
PHASE INSPECTIONS	793	WASTE OIL & FUEL	<10 GALS./MO.	FPTA 2 — DPDO
		WASTE PAINT & MEK	<5 GALS./MO.	FPTA 2 — DPDO
PNEUDRAULICS	792	MEK	<1 GAL./MO.	FPTA 2 — DPDO
		LUBE OIL	10 GALS./MO.	FPTA 2 — DPDO

KEY

———— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FPTA = FIRE PROTECTION TRAINING AREA

DPDO = DEFENSE PROPERTY DISPOSAL OFFICE

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1940 1950 1960 1970 1980
726 TACTICAL CONTROL SQUADRON				
AGE	213	JP-4	<10 GALS./MO.	1960 EVAPORATE / RINSE TO OIL-WATER SEPARATOR/ SANITARY SEWER
		WASTE OIL	150 GALS./MO.	FPTA 2 — DPDO
		PAINT SOLVENTS	<20 GALS./MO.	FPTA 2 — DPDO
VEHICLE MAINTENANCE	211	WASTE OIL	50 GALS./MO.	FPTA 2 — DPDO
482nd CONSOLIDATED AIRCRAFT MAINTENANCE SQUADRON				
ENGINE SHOP	750	WASTE OIL	100 GALS./MO.	1955 FPTA 2 — DPDO
HYDRAULIC SHOP	194	HYDRAULIC FLUID	30 GALS./MO.	FPTA 2 — DPDO
AGE SHOP	208	PD-680	<1 GAL./MO.	FPTA 2 — DPDO
CORROSION CONTROL	173	THINNERS	20 GALS./MO.	FPTA 2 — DPDO
		WASHRACK RINSATE	QUANTITY NOT AVAILABLE	SANITARY SEWER
FUEL SHOP	173	JP-4	80 GALS./MO.	OIL/WATER SEPARATOR/SANITARY SEWER
PHASE INSPECTION	200	JP-4 AND WASTE OIL	<5 GALS./MO.	SPEEDI-DRY/DUMPSTER
WHEEL AND TIRE SHOP	200	PD-680	10 GALS./MO.	FPTA 2 — DPDO
GUN AND RELEASE SHOP	192	PD-680	30 GALS./MO.	FPTA 2 — DPDO

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FPTA = FIRE PROTECTION TRAINING AREA

DPDO = DEFENSE PROPERTY DISPOSAL OFFICE

Typically, small quantities of chemical wastes were sent to Fire Protection Training as well. Currently, JP-4 and diesel fuel are normally used for fire protection training purposes and all other oils and chemicals are turned over to DPDO for disposal. Most drums of paints and chemical wastes generated during the past two or three years are being stored on base (see Storage Areas, below).

Operations Conducted During Period of Base Inactivity

Between 1946 and 1954 Homestead AFB was in an inactive status and ownership of the property was transfered to Dade County. During this period there were several small industrial and commercial activities unrelated to the military which operated on the base. Most, but probably not all, of the wastes generated on base during this period were disposed of in off-base landfills. Several buildings were used as temporary storage facilities and little waste was generated from these activities. One significant waste generator was a small electroplating operation that was located in Building 164. Spent plating solutions containing chromium, nickel, copper, and sulfuric and hydrochloric acids were routinely disposed of by discharging them on the ground in an area just east of Building 164 (Site SP-1). Wastes were generated at a rate of about 250 gallons per month, and the electroplating operation continued for about two years. Today grass and trees are growing in the area, and no visual signs of contamination or environmental stress were observed.

Pesticide Utilization

The storage, control, and disposal of pesticides at Homestead AFB are the responsibility of the Entomology Shop (31st CES). Insecticides are heavily used on the base, particularly during mosquito season, and application is continuous throughout the year. Occasional aerial spraying of insecticides is performed for mosquito control by an off-base team from Rickenbacher AFB. Herbicide use on base was minimal until the late 1970's, when the Entomology Shop assumed this responsibility from Buildings and Grounds Department.

A wide variety of pesticides have been used on base, and a list of these is presented in Appendix D, Table D-1. Materials used by the Entomology Shop are stored in two areas. Nonvolatile and relatively nontoxic chemicals are stored in the Entomology Shop (Building 371),

particularly if they are only used in small quantities (Site P-1). The more toxic chemicals, and any others which are used in large quantities, are stored in a secure fenced area within the Civil Engineering Storage Compound (Site P-2).

Waste pesticides are currently disposed of through DPDO and are generated at a rate of about one 55 gallon drum every three months. Routine disposal through DPDO began only recently. During the period between 1977 and 1982, excess or waste materials, along with rinses from equipment cleaning, were disposed of in a remote open area of the base between the Ordnance Storage Area and the U.S. Customs Area (Figure 4.1) (Site P-3). The practice was to spray the waste materials over a wide area, after which chlorine bleach and ammonia were applied as neutralizing agents. It was reasoned that long term exposure to ultraviolet light and soil microorganisms would eventually result in breakdown of the pesticides and that risk of contaminating ground or surface waters would be minimal. Before 1977, the standard disposal practice was to discharge any waste materials to the base sewage collection plant, at which time waste generation rates are estimated to have been up to one 55 gallon drum per month. Since then, only small amounts of pesticides have been disposed of by means of the sanitary sewer, mostly as a result of cleaning hand-held application equipment. As with other solid wastes, empty drums and other containers have been disposed of in an off-base landfill since the mid-1950's. Since 1976, such containers have been triple rinsed prior to disposal.

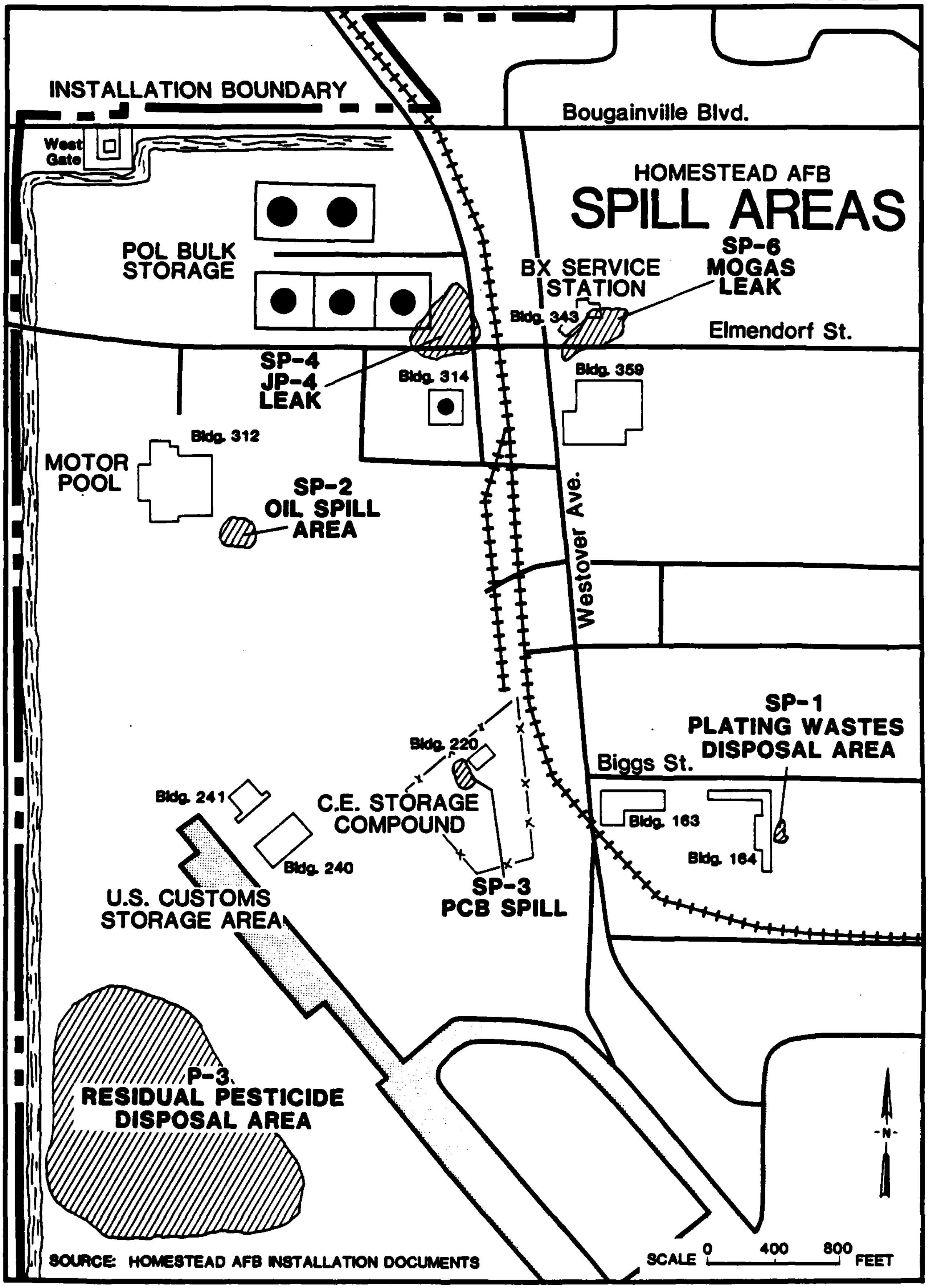
Fire Protection Training

The fire department has operated three different fire protection training areas (FPTA's) since the base was first activated in 1942 (Figure 4.2).

Fire Protection Training Area No. 1 (FPTA-1)

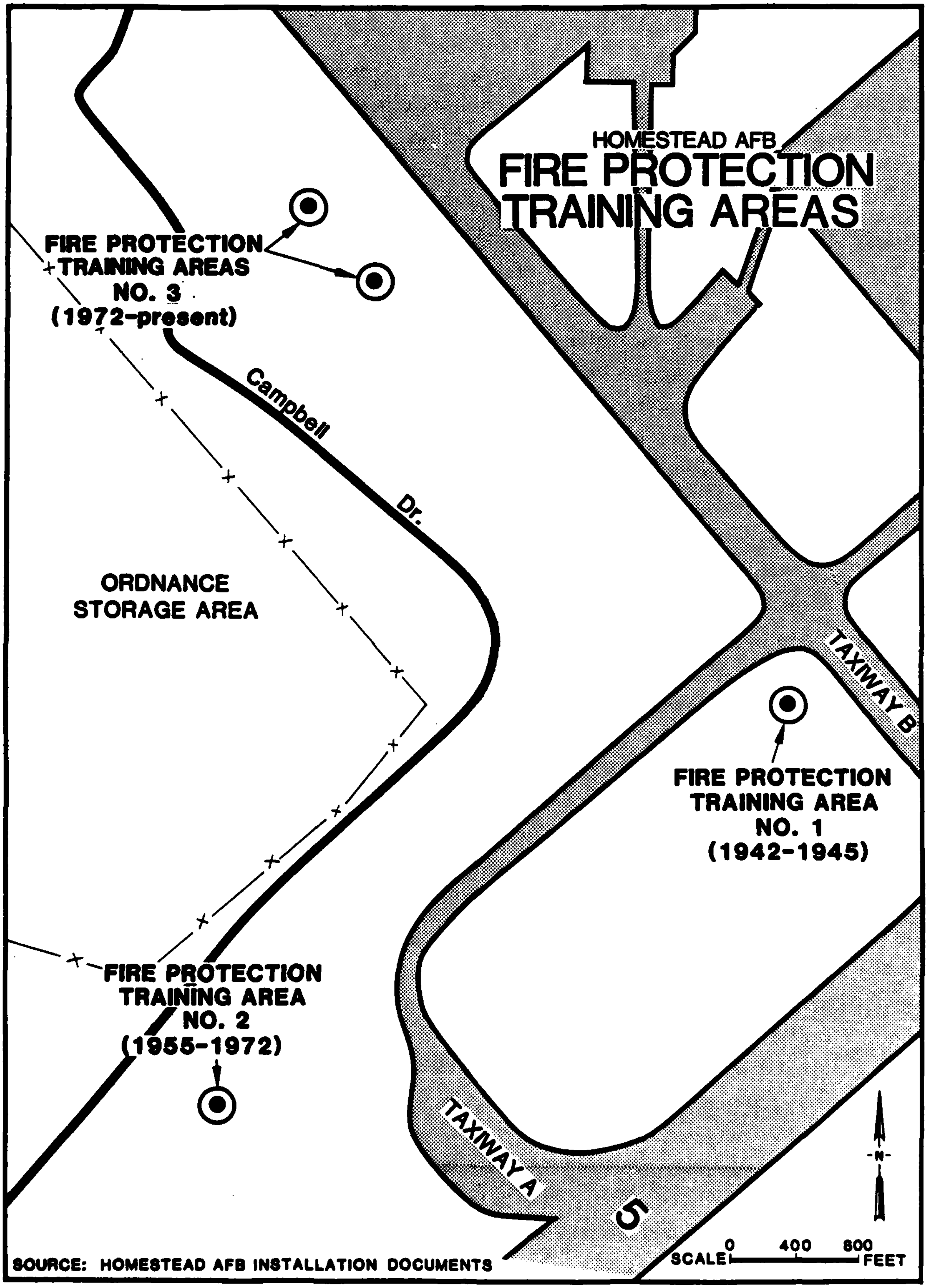
During the 1940's, fire protection training activities were conducted in the area northwest of the present runway, between Taxiways A and B. Pan American Air Ferries, Inc. may have used the same site for fire protection training prior to 1942. No physical evidence of this site exists today, as the area was disturbed during construction of the present runway in 1954. AVGAS was the most commonly used material at this site, and fires were extinguished with water and carbon dioxide.

FIGURE 4.1



ES ENGINEERING-SCIENCE

FIGURE 4.2



ES ENGINEERING-SCIENCE

Fire Protection Training Area No. 2 (FPTA-2)

After the base was rebuilt and reactivated in 1955, fire protection training activities were conducted just north of the approach zone for Runway 05, southwest of Taxiway A. The area can be easily recognized from the air and it appears somewhat charred and barren of vegetation. The area was not equipped with a liner or collection system for residual fluids, and it was not a routine practice to first wet the burn area with water before applying inflammable liquids. Considering the soil and subsurface conditions at the site, it is likely that a portion of any liquids applied during training would have percolated into the ground. A variety of materials were been burned at FPTA No. 2 including JP-4, AVGAS, contaminated fuels, and waste materials from the shops (oils, lubricants, solvents, etc.). Extinguishing agents included water, carbon dioxide, AFFF, and protein foam.

Fire Protection Training Area No. 3 (FPTA-3)

In 1972, fire protection training activities were moved to the present FPTA, partly because smoke generated at the previous site often interfered with flight activities. The currently used FPTA actually consists of two burning areas which are about 100 yards apart. These are located immediately northeast of the ordnance storage area, on the southwest side of an abandoned runway (Taxiway B). The FPTA is equiped with a 5,000 gallon above ground tank which is used to store contaminated fuel (JP-4) for training exercises. During the site visit the pump attached to this tank was leaking fuel at a very low rate. As with the previously used sites, the area is not equipped with a liner or collection system for residual fluids, and it has not been a routine practice to first wet the burn area with water before applying inflammable liquids. The site is built directly on an outcropping of limestone, the surface soil having been removed; it is likely, therefore, that a portion of any liquids applied to the area during fire training percolates into the ground. Materials burned at the site include JP-4 and other contaminated fuels, and a variety of waste materials from the shops (oils, lubricants, solvents, etc.). Burning of waste oils and other materials at the FPTA has been a commonly used disposal method until the late-1970's, when base policy was changed to approve the use of only JP-4 and contaminated JP-4 and diesel fuel for fire protection

training. Anywhere from 50 to 1000 gallons of material have been used at a time and fire protection training activities were typically conducted on a weekly basis. Since the early 1970's, water and Aqueous Film Forming Foam (AFFF) have been the main extinguishing agents used.

Fuels Management

The Homestead AFB fuels management system includes a number of above and below ground storage tanks and pipelines located throughout the base. A summary of the major fuel and oil storage facilities has been provided in Appendix D, Tables D.6, D.7 and D.8. Materials which have been used on base include JP-4, JP-5, AVGAS, MOGAS (regular and unleaded), diesel fuel, and heating fuel oil. In addition, waste fuels and oils have been stored on base prior to their disposal (by burning at FPTA's) or sale to contractors.

By far, JP-4 is the most widely used petroleum product on the base, and it arrives by means of a pipeline. The pipeline and two on-base storage tanks (2.3 million gallons each) are operated by a contractor. JP-4 can also be received by rail or tank truck, although the pipeline has been used almost exclusively since 1960. From the contractor's two storage tanks, JP-4 is pumped to one of four storage tanks in the POL tank farm. Three of these hold 840,000 gallons; the fourth tank holds 420,000 gallons and was used for AVGAS storage until 1980. All six bulk storage tanks are surrounded by earthen dikes that are coated with asphalt. From bulk storage, JP-4 is pumped to a system of storage tanks, pumping stations, and hydrants along the flight apron. Built in the mid-1950's, the aircraft fueling/defueling system consists of eight pump stations, each equipped with six 50,000 gallon underground storage tanks. A ninth pump station, which is also part of the system, has four 50,000 gallon storage tanks. (Pump station number one was used for JP-5 until 1982 when it was converted for use with JP-4.) Aircraft can also be serviced by tank trucks, and there are several truck fillstands associated with the hydrant/storage system.

Fuels and oils other than JP-4 arrive on base either by truck or rail. Diesel fuel and MOGAS, including both regular and unleaded, are stored in seven underground tanks located at the BX service station (Building 343), the military vehicle service station (Building 195), and near Buildings 207 and 171. Fuel oil for heating is mainly used at the

shops and industrial buildings where it is generally stored in small above-ground tanks (base houses are heated electrically). AVLUB (aviation lubricating oil) is stored in bulk at two 11,500-gallon underground tanks.

Sludges and other solids removed during tank cleaning operations at the bulk storage area have typically been placed in the diked areas surrounding the storage tanks for weathering, after which they were removed to the FPTA for burning or sent off site for disposal. Sludges from flightline tank cleaning operations were weathered and disposed of off site. Currently the practice is to drum tank sludges and dispose of through DPDO.

Waste oils and solvents are currently disposed of through DPDO. Off-base contractors make regular pickups at waste oil storage tanks located at several points throughout the base. Separate tanks are provided for synthetic and petroleum products.

Beginning sometime in the 1960's and ending in 1980, oils, solvents, and other liquid wastes from the flight line operations were transported to two above-ground storage tanks (750 and 1,500 gallons) located at the aircraft wash rack area near Building 724 (Figure 4.5) (Site SP-7). From these tanks, waste oils were either taken to the FPTA for use during training exercises or they were sold to off-base contractors. Partly because of their small size, operation of these tanks resulted in frequent spills, overflows, and leaks. Evidence of spills cannot be seen today, as the area has recently been disturbed and surface soil either removed or covered. During the 1950's wastes were hauled directly to the FPTA in drums and bowsers. Spills are discussed in greater detail in a separate section below.

A similar procedure has been in use for handling waste oils from the motor pool (Building 312). In this case, the waste oil is collected in two 500-gallon tanks pending disposal. Over a period of many years, there have been a number of leaks which resulted in oil being spilled onto the ground (Site SP-2).

Waste fuels are generally transported by bowser to the 5000 gallon storage tank in the FPTA, although they may be sold through DPDO to off-base contractors.

Storage Areas

Waste chemicals and used oils have been stored in several areas throughout the base. In most cases, the wastes have been temporarily stored at the site of generation until the wastes were removed for final disposal. At the time of the site visit, 62 drums were being stored just northwest of Bldg. 720, most containing paint and solvent-related wastes (Site S-1). No significant spills have occurred in this area. The Defense Property Disposal Office (DPDO) storage yard has no hazardous wastes stored within its boundaries.

Out-of-service transformers containing polychlorinated biphenyls (PCBs) or PCB-contaminated dielectrics have been stored in the PCB Transformer Storage Facility (Building 183) or in the CE storage yard pending DPDO contract disposal. One minor spill of PCB-contaminated transformer oil is discussed in the spill section below (Site SP-3). No other PCB-related spills are known to have occurred.

DESCRIPTION OF PAST ON-BASE TREATMENT AND DISPOSAL METHODS

The facilities on Homestead AFB which have been used for the management and disposal of waste can be categorized as follows:

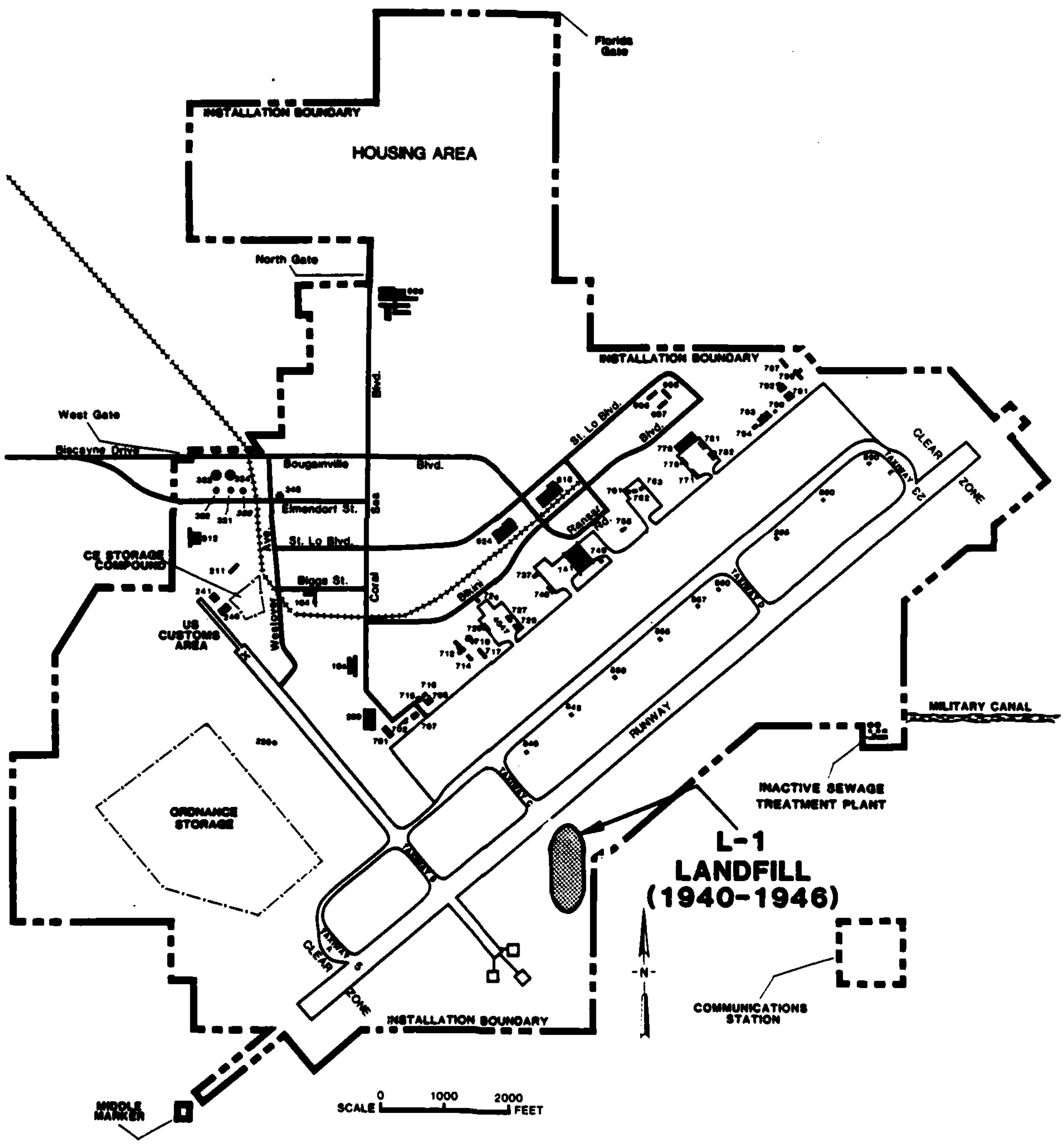
- o Landfills
- o Hardfill Disposal Areas
- o Sewage Treatment Plant
- o Incinerators
- o Storm Water Drainage
- o Spills and Leaks

Landfills

Only one landfill has been operated on the base property (Site L-1). Beginning sometime before the base was acquired by the government, an open dump was operated by Pan American Air Ferries, Inc., in the area just southeast of the present runway, directly across from Taxiway C (Figure 4.3). In 1943, operation of this dump was changed to something more typical of a landfill: the top few feet of soil were

FIGURE 4.3

HOMESTEAD AFB
LANDFILL SITE



NOTE: BUILDING NUMBERS ARE LOCATED ADJACENT TO BUILDING SITES

SOURCE: HOMESTEAD AFB INSTALLATION DOCUMENTS

ES ENGINEERING-SCIENCE

removed, then refuse was spread out and covered up with soil. No burning was done in this area and general refuse of all types was probably disposed of at the site.

Operation of the landfill continued until 1946 when the base was destroyed by a hurricane and was subsequently deactivated. Although there is little information about on-base waste disposal during the period from 1946 to 1955, some additional waste materials were probably disposed of in the same area. When the base was reactivated in 1955, contracts were established for off-base refuse disposal, and since that time no landfills have been operated on base property. Today, there is no visible evidence that a landfill/dump existed at the site, probably because it was disturbed during construction of the present runway in the mid-1950's.

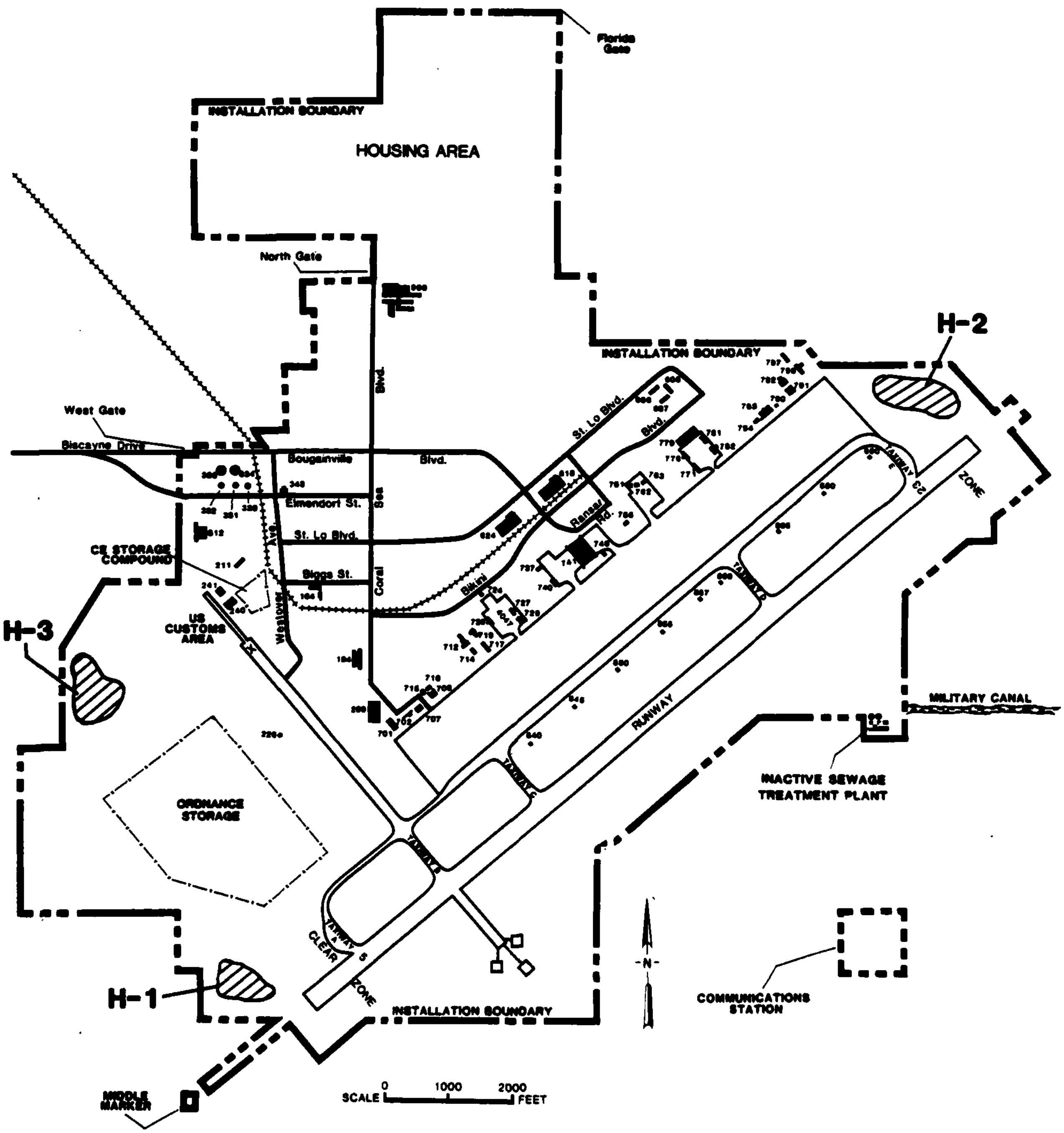
Hardfill Disposal Areas

Three main areas have been used for on-base disposal of hardfill materials: (1) south of the ordnance storage area just north of the approach zone for Runway 05 (Site H-1), (2) at the extreme northeast corner of the base just north of the approach zone for Runway 23 (Site H-2), and (3) at the western edge of the base between the ordnance storage area and the U. S. Customs Area (Site H-3)(See Figure 4.4). Materials that were disposed of in the hardfill areas include concrete, asphalt, excavated earth, and other construction debris. Following the hurricane in 1945, demolished buildings were reportedly burned on base, perhaps at one of these sites, and some of the debris and ashes may have been hardfilled. Given the nature of the materials disposed of in the hardfill areas, there is no reason to suspect that any contamination problems exist at these sites.

Sewage Treatment Plant

A treatment plant was constructed on base during the mid-1950's, consisting of primary clarification, trickling filters, secondary clarification, anaerobic sludge digestion, and sludge drying beds. Located on the Military Canal at the eastern side of the base, it was used to treat all the domestic and industrial wastewater generated on base until early 1983, when it was taken out of service. Sludges from the drying

HOMESTEAD AFB
HARDFILL DISPOSAL AREAS



NOTE: BUILDING NUMBERS ARE LOCATED ADJACENT TO BUILDING SITES

SOURCE: HOMESTEAD AFB INSTALLATION DOCUMENTS

beds were spread on the ground in the area surrounding the sewage treatment plant (Site D-1). Beginning in early 1983, wastewater from the base has been discharged to a regional wastewater treatment facility.

Incinerator

When the base was rebuilt in the mid-1950's, an incinerator was constructed at the sewage treatment plant site for reduction of solid wastes generated on base. Operation of the incinerator was stopped sometime in the late 1950's or early 1960's after which it remained idle until it was dismantled in the late 1970's. Ash was disposed of in the immediate area, along with sludge from the sewage treatment plant (Site D-2).

Storm Water Drainage System

Stormwater drainage at Homestead AFB is accomplished mainly by overland flow to open drainage ditches which direct the flow to the Boundary Canal. The general drainage patterns on the base are illustrated in Figure 3.2. The north and south branches of the Boundary Canal converge on a stormwater reservoir located near the sewage treatment plant, from which water either flows through control gates or is pumped to the military canal. The canal flows eastward and discharges into to Biscayne Bay.

The stormwater drainage system receives small amounts of wastes from aircraft and vehicle maintenance, mainly in the form of runoff after a rainfall. Typically, fuel spills are washed down into the storm drainage system as a fire prevention measure. All of the washrack areas have oil/water separators installed which discharge to the sanitary sewer. The pumping stations and fuel storage areas have fuel collection sumps, and do not discharge to the stormwater drainage system.

Spills and Leaks

Small spills have occurred in several areas throughout the base. Most of these result from fuel transfer and aircraft fueling/defueling operations. Such spills typically occur on paved areas and are easily cleaned up or contained until the spilled fuel can evaporate. No significant environmental contamination is attributed to these spills.

Several larger spills and leaks have occurred at Homestead AFB which are potentially of environmental concern. During the late 1950's there was an underground pipeline leak at the POL Bulk Storage Tank Farm

which resulted in the loss of a large, but unknown, quantity of JP-4 (Site SP-4). The leak was located and repaired in 1958. During the late 1950's and early 1960's vegetation was killed in the area around the tank farm. Also during this period strong fuel odor could be detected following heavy rainfalls and occasionally, the road would be closed to automobile traffic over concern that the area might represent a fire hazard. These problems continued for several years after the pipeline was repaired, indicating that extensive ground-water contamination resulted from the leak (See Figure 4.1).

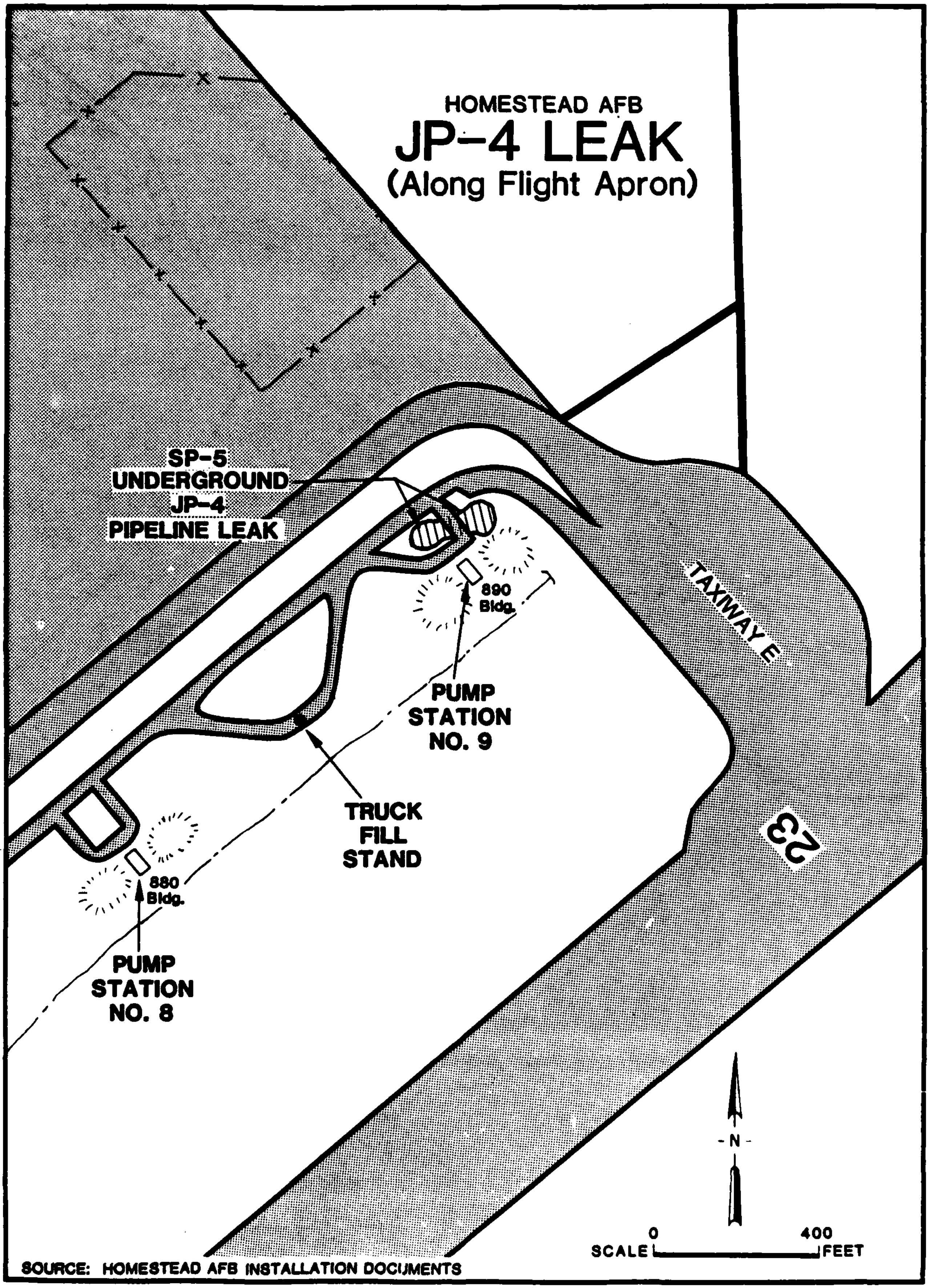
Another underground pipeline leak occurred in May 1982 at Pump Station Number Nine (Building 890), located at the northeastern end of the main flight apron (Figure 4.5) (Site SP-5). Although the amount of fuel (JP-4) lost is not known, fuel was observed to be floating in a nearby drainage ditch. The leak was repaired and attempts were made to clean up the spilled fuel.

A MOGAS (regular leaded) leak is suspected to have occurred at the BX Service Station (Building 343) during 1980 (Figure 4.1) (Site SP-6). Small discrepancies were noted in the monthly gasoline inventories, after which two underground storage tanks were pressure tested for possible leaks and subsequently lined with fiberglass. An accurate estimate of the amount of Mogas involved was not available. The leak site is included as a suspected potential source of environmental contamination.

Waste oils from the Motor Pool are collected and stored behind Building 312 in two 500-gallon tanks prior to disposal by a contractor (Site SP-2). Over the many years that this practice has been followed, occasional spillage and leaks have occurred. Based upon the practices observed, discussions with base personnel, and a visit to the site, leaks and spills at this site have probably occurred frequently over a period of many years. Also at this site are a number of used batteries stored on the ground.

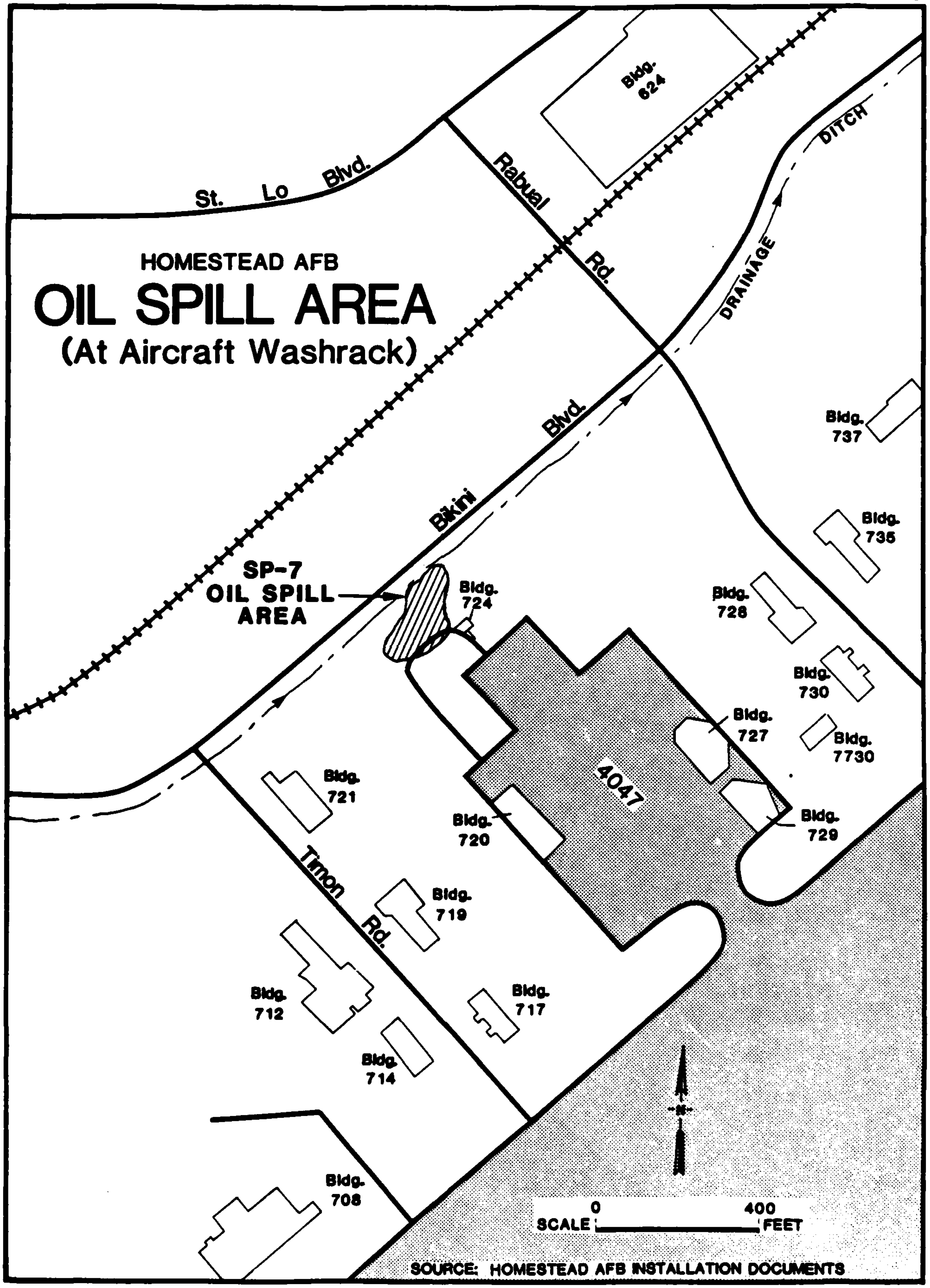
During the period from about 1970 to 1980, two storage tanks for liquid wastes were operated at the aircraft wash rack area, apron 4047, near Building 724 (See Figure 4.6) (Site SP-7). These tanks (750 and 1,500 gallons) were used as a collection point for waste oils, hydraulic fluids, solvents, and other liquid wastes generated in the shops on the

FIGURE 4.5



ES ENGINEERING-SCIENCE

FIGURE 4.6



ES ENGINEERING-SCIENCE

flight line. Wastes from these tanks were removed for disposal on a regular basis; however, the operating procedures used and the small size of the tanks resulted in frequent spills and overflows which ran directly onto the ground. No visible evidence of this site remains today, as the area was recently disturbed and surface soils were covered.

A spill of PCB contaminated (>50 and <500 ppm PCB) transformer fluid occurred at the Civil Engineering Storage Compound in about 1981 (Figure 4.1) (Site SP-3). Less than 100 gallons of dielectric fluid was involved. Shortly afterwards, the contaminated soil was sampled and found to contain less than 50 ppm of PCB. Based on these results, the soil was removed and disposed of at an off-base site. The spill site is considered to have only a slight potential for contamination since cleanup occurred soon after the spill and the potential migratory material was removed.

EVALUATION OF PAST DISPOSAL ACTIVITIES AND FACILITIES

None of the remote base annexes were found to have significant waste generation or disposal activities, past or present.

The review of past operation and maintenance functions and past waste management practices at Homestead AFB has resulted in the identification of 20 sites which were initially considered as areas of concern with regard to the potential for contamination, as well as the potential for the migration of contaminants. These sites were evaluated using the Decision Tree Methodology referred to in Figure 1.1. Those sites which were considered as not having a potential for contamination were deleted from further consideration. Those sites which were considered as having a potential for the occurrence of contamination and migration of contaminants were further evaluated using the Hazard Assessment Rating Methodology (HARM). Table 4.2 identifies the decision tree logic used for each of the areas of initial concern.

Based on the decision tree logic, eight of the 20 sites originally reviewed did not warrant evaluation using the Hazard Assessment Rating Methodology. The rationale for omitting these eight sites from HARM evaluation is discussed below.

The three hardfill sites identified on the base (Sites H-1, H-2 and H-3) received only construction rubble (i.e., scrap wood, concrete,

TABLE 4.2
SUMMARY OF DECISION TREE LOGIC FOR AREAS OF INITIAL ENVIRONMENTAL CONCERN AT HOMESTEAD AFB

Site No.	Site Description	Potential For Contamination	Potential For Contaminant Migration	Potential For Other Environmental Concern	HARM Rating
SP-3	PCB Spill in CE Storage Compound	YES	YES	N/A	YES
L-1	Landfill	YES	YES	N/A	YES
H-1, H-2, H-3	Hardfill Areas (3 sites)	NO	NO	NO	NO
D-1	Sewage Treatment Plant Sludge	NO	NO	NO	NO
D-2	Incinerator Ash Disposal Disposal	YES	NO	NO	NO
SP-5	Pump House No. 9 Leak	YES	YES	N/A	YES
FPTA-1	Fire Protection Training Area No. 1	YES	YES	N/A	YES
FPTA-2	Fire Protection Training Area No. 2	YES	YES	N/A	YES
FPTA-3	Fire Protection Training Area No. 3	YES	YES	N/A	YES
SP-6	BX Service Station MOGAS Leak	YES	YES	N/A	YES
S-1	Drum Storage Area, Bldg. 720	NO	NO	N/A	NO
SP-2	Oil Leakage Behind Motor Pool	YES	YES	N/A	YES
SP-7	Oil Spills at Aircraft Wash Rack	YES	YES	N/A	YES
P-3	Residual Pesticide Disposal Areas	YES	YES	N/A	YES
P-2	Entomology Storage Area (C. E. Storage Compound)	YES	YES	N/A	YES
P-1	Entomology Storage Area (Bldg. 371)	YES	NO	NO	NO
SP-1	Electroplating Waste Disposal Site	YES	YES	N/A	YES
SP-4	POL Bulk Tank Area Leak	YES	YES	N/A	YES

N/A Not Applicable

metal and bricks) and landscape debris. These materials are typically inert or non-putrescible and hence, would not cause any contamination to the surface water or ground water.

The sewage treatment plant has operated by a standard procedure since its beginning and its output has always been closely monitored. Sludge from this plant was digested and nontoxic and was land farmed in the area immediately around the plant (Site D-1). It is not expected that any potential for contamination exists at this site.

The incinerator has been inoperative since, at the latest, the early 1960's. Based on information available and interviews with relevant personnel, the ash from this facility was nonhazardous and was disposed of by mixing it with the wastewater treatment plant sludge prior to land farming (Site D-2). The potential for contamination at this site is considered to be very small.

The drum storage area outside Building 720 is inspected regularly and information concerning the site is well documented (Site S-1). This site is not considered contaminated.

Only nonvolatile and relatively nontoxic chemicals have been stored in the Entomology Shop (Building 371) (Site P-1). No significant spills have been reported. The potential for contamination at this site is considered to be very small.

The remaining 13 sites identified on Table 4.2 were evaluated using the Hazard Assessment Rating Methodology. The HARM process takes into account characteristics of potential receptors, waste characteristics, pathways for migration, and specific characteristics of the site related to waste management practices. The details of the rating procedures are presented in Appendix G. Results of the assessment for the sites are summarized in Table 4.3. The HARM system is designed to indicate the relative need for follow-on action. The information presented in Table 4.3 is intended for assigning priorities for further evaluation of the Homestead AFB disposal areas (Chapter 5, Conclusions and Chapter 6, Recommendations). The rating forms for the individual waste disposal sites at Homestead AFB are presented in Appendix H. Photographs of some of the disposal sites are included in Appendix F.

TABLE 4.3
SUMMARY OF HARM SCORES FOR POTENTIAL CONTAMINATION SOURCES
HOMESTEAD AFB

Rank	Site Name and No.	Receptor Subscore	Waste Characteristics Subscore	Pathways Subscore	Waste Management Factor	Overall Total Score
1.	Electroplating Waste Disposal Site (SP-1)	54	80	81	1.0	72
2.	Leak at POL Bulk Storage Tank Farm (SP-4)	72	48	88	1.0	69
3.	Oil Spills at Aircraft Wash Rack (SP-7)	54	72	81	1.0	69
4.	Fire Protection Training Area No. 3 (FPTA-3)	53	64	81	1.0	66
5.	Fire Proection Training Area No. 2 (FPTA-2)	53	64	81	1.0	66
6.	MOGAS Leak at BX Service Station (SP-6)	72	40	81	1.0	64
7.	Entomology Storage Area (P-2)	70	54	74	0.95	63
8.	Oil Leakage Behind Motor Pool (SP-2)	72	24	81	1.0	59
9.	Fire Protection Training Area No. 1 (FPTA-1)	47	48	81	1.0	59
10.	Leak at Pump Station No. 9 on Flight Apron (SP-5)	47	48	88	0.95	58
11.	Residual Pesticide Disposal Area (P-3)	68	24	81	1.0	58
12.	Landfill (L-1)	45	16	88	1.0	50
13.	PCB Spill in Civil Engineering Storage Compound (SP-3)	72	60	81	0.10	7

CHAPTER 5

CONCLUSIONS

The goal of the IRP Phase I study is to identify sites where there is the potential for environmental contamination resulting from past waste disposal practices and to assess the probability of contaminant migration from these sites. The conclusions given below are based on field inspections, review of records and files, review of the environmental setting, and interviews with base personnel, past employees, and state and local government employees. Table 5.1 contains a list of the potential contamination sources identified at Homestead AFB and a summary of the HARM scores for those sites.

ELECTROPLATING WASTE DISPOSAL AREA (SP-1)

During the period that the base was inactive, between 1946 and 1953, a small electroplating shop was operated in Building 164. Spent plating baths and rinses were disposed of by pouring them on the ground in an area just east of Building 164. The wastes were generated at a rate of about 250 gallons per month for a two year period. Although no visible evidence of contamination exists today, these wastes contained several persistent heavy metals, which are not likely to have degraded or decomposed since entering the groundwater. The site received a HARM score of 72. This moderate-to-high score is largely the result of the nature of the waste (persistent metals) and does not reflect the site conditions which have probably caused the dissipation of the waste by now (e.g., high ground-water flow rates, heavy rain infiltration and a disposal-to-present-day interval of 35 years).

LEAK AT POL BULK STORAGE TANK FARM (SP-4)

Around 1958 it was discovered that a leak had developed in an underground pipeline at the POL Bulk Storage Tank Farm which resulted in a significant, but unknown, quantity of JP-4 jet fuel being lost to the

TABLE 5.1
SITES ASSESSED USING THE HARM METHODOLOGY
HOMESTEAD AFB

Rank	Site Name and No.	Date of Operation or Occurrence	Overall Total Score
1	Electroplating Waste Disposal Site (SP-1)	1946-1953	72
2	Leak at POL Bulk Storage Tank Farm (SP-4)	1958	69
3	Oil Spills at Aircraft Wash Rack (SP-7)	Early 1970's-1981	69
4	Fire Protection Training Area No. 3 (FPTA-3)	1972-present	66
5	Fire Protection Training Area No. 2 (FPTA-2)	1955-1972	66
6	MOGAS Leak at BX Service Station (SP-6)	1980	64
7	Entomology Storage Area (P-2)	1960's-present	63
8	Oil Leakage Behind Motor Pool (SP-2)	1960's-present	59
9	Fire Protection Training Area No. 1 (FPTA-1)	Early 1940's	59
10	Leak at Pump Station No. 9 on Flight Apron (SP-5)	1982	58
11	Residual Pesticide Disposal Area (P-3)	1977-1982	58
12	Landfill (L-1)	Early 1940's	50
13	PCB Spill in Civil Engineering Storage Compound (SP-3)	1981	7

NOTE: This ranking was performed according to the Hazard Assessment Rating Methodology (HARM) described in Appendix G. Individual site rating forms are in Appendix H.

ground. Contamination of the ground water is almost certain, since heavy rains raising the water table have caused fuel to appear in the surrounding drainage ditches, making it necessary to close nearby roads as a fire safety precaution. In addition, trees and other vegetation in the area were killed. Evidence of contamination persisted for several years after the leak was repaired, but eventually the spill dissipated and today no visible evidence remains. It is likely that during the 25 year period a combination of high ground water flow rates, surface flow following heavy rains, and evaporation have resulted in the disappearance of spilled fuel from the area. The site received a moderate-to-high HARM score of 69, which is a result of the leak's close proximity to the base water supply wells and its short pathway to the freshwater aquifer.

OIL SPILLS AT AIRCRAFT WASHRACK (SP-7)

Between about 1970 and 1980, contaminated oils, hydraulic fluids, solvents, and other liquid wastes generated in the shops on the flight line were routinely transported to two storage tanks located near the aircraft washrack on flight apron 4047 prior to disposal. These tanks frequently overflowed onto the ground and possibly into a nearby drainage ditch. In addition, numerous spills and occasional dumping of wastes also occurred at the site. Since these tanks were taken out of service in 1980, the site has been disturbed and the contaminated surface soil was either removed or covered. Today, no visible evidence of contamination remains. The site received a HARM score of 69. This moderate-to-high score is due largely to the moderate quantity of hazardous waste disposed of in an area scoring high as a migration pathway.

FIRE PROTECTION TRAINING AREA NO. 3 (FPTA-3)

Since 1972, all fire training activities have been conducted in the present Fire Protection Training Area (FPTA), which is located just northeast of the Ordnance Storage Area. The FPTA, which is actually composed of two burning areas, does not contain a liner system, and preapplication of water to inhibit percolation into the soil has not been a routine practice at the base. Given the extremely permeable nature of

the soils and underlying rock in the area, it is reasonable to conclude that ground-water contamination has probably resulted from fire training activities at this site. A wide variety of materials has been burned during fire training, including JP-4, AVGAS, MOGAS, and liquid wastes from the shops. In addition, sludges from fuel tanks and other wastes were occasionally disposed of at the site. Typically, water and AFFF were used as fire extinguishing agents. The site received a HARM score of 66. This moderate-to-high score is a result of the moderate quantity of a variety of hazardous wastes disposed of in an area scoring high as a migration pathway.

FIRE PROTECTION TRAINING AREA NO. 2 (FPTA-2)

Beginning when the base was reactivated in 1955 and continuing until 1972, the FPTA was located south of the Ordnance Storage Area, just north of the approach zone to Runway 05. Evidence of the site can still be seen today. Materials burned at the site were the same as those burned at FPTA No. 3 and probably included a variety of wastes other than contaminated fuels and oils. For the same reasons discussed under FPTA No. 3, it is reasonable to conclude that ground-water contamination probably occurred as a result of fire training activities conducted at this site. This site also received a HARM score of 66. This moderate-to-high score is a result of the moderate quantity of a variety of hazardous wastes disposed of in an area scoring high as a migration pathway.

MOGAS LEAK AT BX SERVICE STATION (SP-6)

During 1980 a discrepancy was recorded in the regular leaded gasoline inventory which was presumed to have been the result of a leak from an underground storage tank. Two tanks were subsequently lined with fiberglass, although a loss of MOGAS into the ground was not actually confirmed. Because of the likelihood for ground-water contamination from such a leak, the site was included as a suspected potential source of contamination. It received a HARM score of 64. This moderate-to-high score is a result of the area's close proximity to the base water supply wells as well as the area's high score as a migration pathway.

ENTOMOLOGY STORAGE AREA (P-2)

Since the 1960's, the Entomology Shop has stored its more toxic chemicals in a fenced and sheltered area within the Civil Engineering Storage Compound. Other chemicals which they used in bulk have been stored there as well. The area is a raised concrete pad, surrounded by earth and open at the sides. There is visual evidence of spills at the base of the pad. The site received a HARM score of 63. This moderate-to-high score is mainly due to the storage area's proximity to the base water supply wells and its location over the freshwater aquifer.

OIL LEAKAGE BEHIND MOTOR POOL (SP-2)

Waste oils from the Motor Pool are collected in two 500-gallon tanks that are stored behind Building 312 prior to disposal, a practice which has been followed since the 1960's. Over the years, leaks have occurred which resulted in oil being spilled onto the ground. Evidence of these spills is visible at the site today. In addition to waste oils, a number of used batteries are also stored at the site, introducing the possibility that spills of battery acid may have occurred in the area. Partly because of its proximity to the well field number two, the site received a HARM score of 59. This moderate-to-high score results from the high score of the area as a migration pathway and the close proximity of the site to base water supply wells.

FIRE PROTECTION TRAINING AREA NO. 1 (FPTA-1)

The first FPTA operated on the base was located northwest of the present runway near Taxiway B. Relatively little is known about the specific practices followed at the time, but it is reasonable to conclude that waste and contaminated fuels and oils were burned during fire training activities. In addition, other wastes may have been disposed of or burned at the site. The site was used during the early 1940's, and was later disturbed when the present runway was constructed. Today no visible evidence of the site remains. The site received a HARM score of 59. This is the result of the hazardous nature of the variety of wastes disposed of in an area that is rated high as a migration pathway.

LEAK AT PUMP STATION NO. 9 ON THE FLIGHT APRON (SP-5)

In May of 1982 a leak was discovered in an underground pipeline resulting in the loss of an unknown quantity of JP-4. The occurrence of some ground-water contamination is almost certain, as fuel appeared in nearby drainage ditches and other low-lying areas. Attempts were made to cleanup the spill, and floating fuel was recovered from nearby surface waters. Any fuel which was not recovered during cleanup has probably dissipated since there is no appearance of fuel or fuel odors in the area, even after heavy rains. The site received a HARM score of 58. This low score is due to the waste's moderate hazard rating and the leak's location over the area of salt water intrusion.

RESIDUAL PESTICIDE DISPOSAL AREA (P-3)

Between 1977 and 1982 waste pesticides used by the Entomology Shop were disposed of in an open area between the Ordnance Storage and the U.S. Customs Storage Areas. The disposal practice involved spraying the wastes on the ground over a twenty acre area, followed by application of chlorine bleach and ammonia to help break down the chemicals. While the wastes were not applied in a concentrated form on a localized area, the extremely permeable nature of the surface soils and underlying rock in the area make the site a potential source of ground-water contamination. The site received a HARM score of 58. This low score is due to the waste's moderate hazard rating.

LANDFILL (L-1)

The only landfill which was operated on base property was closed sometime after Homestead was placed on inactive status in 1945. The landfill was located just south of the present runway opposite of Taxiway B. During construction of the new runway in the mid 1950's, the area was disturbed, and today no visible evidence of the site remains. Originally operated as an open dump, and later as a landfill, the site received essentially all of the refuse generated on base in the 1940's. It was reported that little or no burning of wastes occurred at the landfill. The site received a HARM score of 50. This low score is the result of the waste's non-persistent nature, its physical state, and degredation over the last 35 years.

PCB SPILL IN CIVIL ENGINEERING STORAGE COMPOUND (SP-3)

In 1981 a spill of PCB-contaminated (>50 and <500 ppm) dielectric fluid occurred from an electrical transformer stored in the Civil Engineering Storage Compound. Samples of the contaminated soil were taken and upon analysis were found to contain less than 50 ppm of PCB. The contaminated soil was then removed and disposed of at an off-base site. The potential for contamination from this site is considered to be low. The site received a HARM score of 7, a low score due mainly to the removal of contaminated soil from the area.

CHAPTER 6

RECOMMENDATIONS

Thirteen sites were identified at Homestead AFB as having the potential for environmental contamination and have been evaluated using the HARM system. This evaluation assessed their relative potential for environmental contamination and along with relevant site specific information identified those sites where further study and monitoring may be necessary. Of primary concern are those sites with a high potential for environmental contamination that should be investigated in Phase II. Sites of secondary concern are those with moderate potential for environmental contamination. Further investigation at these sites is also recommended. No further monitoring is recommended for those sites with low potential for environmental contamination, unless other data collected indicate a potential problem could exist at one of these sites. All sites have been reviewed with regard to future land use restrictions which may be applicable due to the nature of each site.

PHASE II MONITORING RECOMMENDATIONS

The following recommendations are made to further assess the potential for environmental contamination from waste disposal areas at Homestead AFB. The recommended actions are generally one-time sampling programs to determine if contamination does exist at the site. If contamination is identified, the sampling program may need to be expanded to further define the extent of contamination. The recommended monitoring program for Phase II is summarized in Table 6.1. Figure 6.1 identifies the eight sites recommended for monitoring.

1) The Electroplating Waste Disposal Site (Figure 6.2) (SP-1) has a moderate potential for environmental contamination and monitoring of this site is recommended. One existing base water supply well (the one

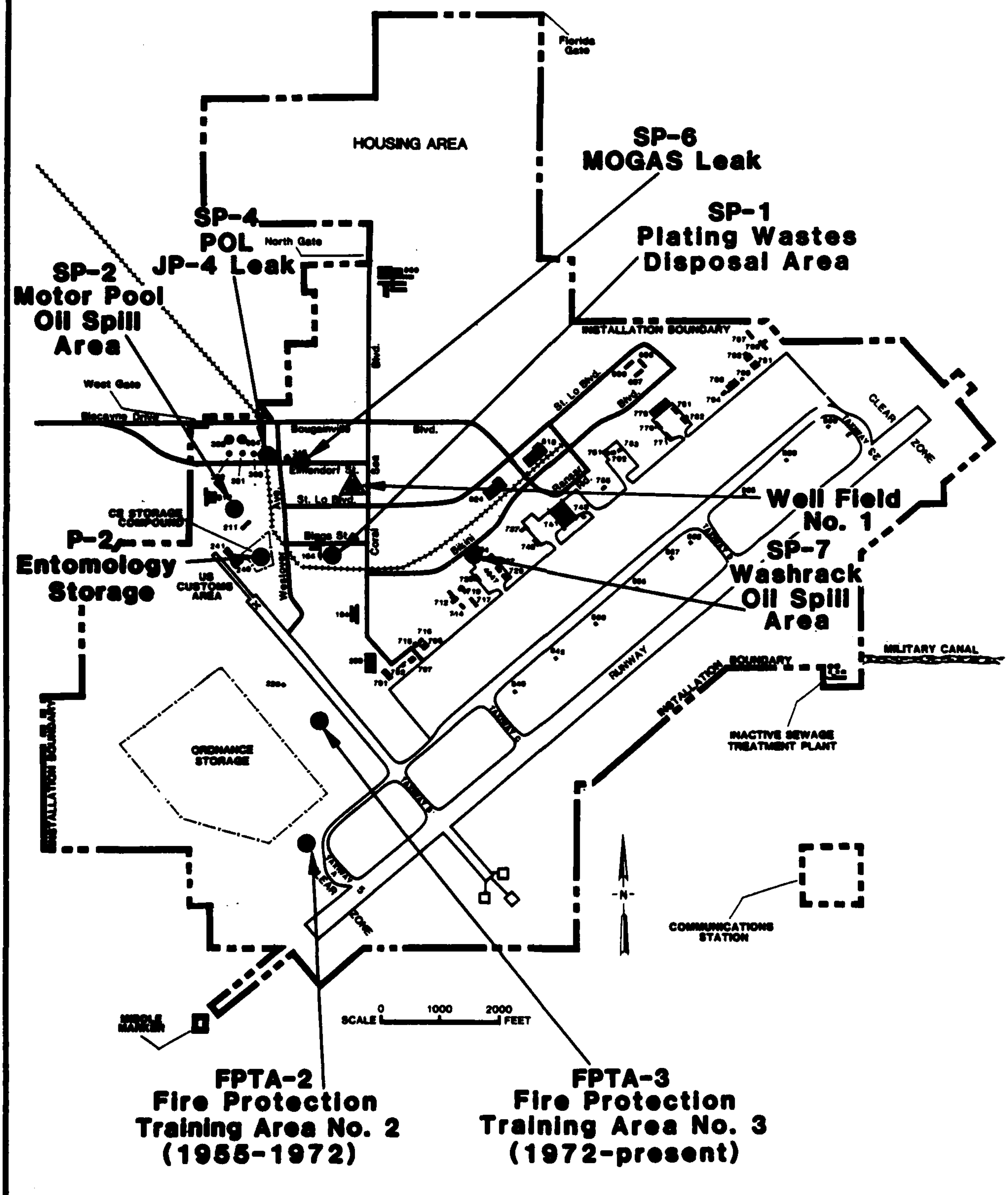
TABLE 6.1
SUMMARY OF RECOMMENDED MONITORING PROGRAM FOR PHASE II
HOMESTEAD AFB

Site	Rating Score	Recommend Monitoring	Comments
1) Electroplating Waste Disposal Site (SP-1)	72	Sample existing base well and analyze for parameters in Table 6.2, List B.	Continue monitoring if sampling indicates metals contamination. Additional monitoring wells may be necessary to assess extent of contamination.
2) Leak at POL Bulk Storage Tank Farm (SP-4)	80	Install 1 upgradient and 3 down-gradient ground-water monitoring wells. Wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 to 15 feet deep). Analyze samples for parameters in Table 6.2, List A.	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination.
3) Oil Spills At Aircraft Wash Rack (SP-7)	69	Install 1 upgradient and 2 down-gradient ground-water monitoring wells. Wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 to 15 feet deep). Sample these wells and analyze for parameters in Table 6.2, List C.	Continue monitoring if sampling indicates contamination. GC/MS Scan may be run to identify organic contaminants found. Additional wells may be necessary to assess of contamination.
4) Fire Protection Training Area No. 3 (FPTA-3)	66	Install 1 upgradient and 3 down-gradient ground-water monitoring wells. Wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 to 15 feet deep). Sample these wells and analyze for parameters in Table 6.2, List C.	Continue monitoring if sampling indicates contamination. GC/MS Scan may be run to identify organic contaminants found. Additional wells and/or soil samples may be necessary to assess extent of contamination.
5) Fire Protection Training Area No. 2 (FPTA-2)	66	Install 1 upgradient and 2 down-gradient ground-water monitoring wells. Wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 to 15 feet deep). Sample these wells and analyze for parameters in Table 6.2, List C.	Continue monitoring if sampling indicates contamination. GC/MS Scan may be run to identify organic contaminants found. Additional wells may be necessary to assess extent of contamination.
6) MOGAS Leak at BX Service Station (SP-6)	64	Install 1 upgradient and 2 down-gradient ground-water monitoring wells. Wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 to 15 feet deep). Sample these wells and analyze for parameters in Table 6.2, List D.	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination. Collect and analyze 5 local soil samples for the same parameters.
7) Entomology Storage Area in CE, Storage Compound (P-2)	63	Collect 5 soil samples in immediate area and perform water extraction on them. Analyze extract for parameters in Table 6.2, List E.	Establish additional sampling stations if contamination is found to determine the extent of contamination.
8) Oil Leakage Behind Motor Pool (SP-2)	59	Collect 5 soil samples and 3 surface water samples in area of oil leakage. Perform water extractions on soil samples. Analyze for the presence of compounds identified in Table 6.2, List D.	Establish additional sampling stations if contamination is found to determine the extent of contamination.

FIGURE 6.1

HOMESTEAD AFB

SITES OF RECOMMENDED ENVIRONMENTAL MONITORING



NOTE: BUILDING NUMBERS ARE LOCATED ADJACENT TO BUILDING SITES

ES ENGINEERING-SCIENCE

currently or most recently in service) from Field No. 1 should be sampled and analyzed for the parameters in Table 6.2, List B.

2) The leak at the POL Bulk Storage Tank Farm (Figure 6.2) (SP-4) has a moderate potential for environmental contamination and monitoring of this site is recommended. A ground-water monitoring system should be established to characterize the ground-water quality and identify any contaminant migration. One upgradient and three downgradient monitoring wells should be installed. The wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 feet deep). Samples collected from these wells should be analyzed for the parameters in Table 6.2, List A.

3) The Oil Spill Area at the Aircraft Wash Rack (Figure 6.3) (SP-7) has a high potential for environmental contamination and monitoring of this site is recommended. A ground-water monitoring system should be established to characterize the ground-water quality and identify any contaminant migration. One upgradient and two downgradient monitoring wells should be installed. The wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 feet deep). Samples collected from these wells should be analyzed for the parameters in Table 6.2, List C.

4) Fire Protection Training Area No. 3 (Figure 6.4) (FPTA-3) has a high potential for environmental contamination and monitoring of this site is recommended. A ground-water monitoring system should be established to characterize the ground-water quality and identify any contaminant migration. One upgradient and three downgradient monitoring wells should be installed in the area. The wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 feet deep). Samples collected should be analyzed for the parameters in Table 6.2, List C.

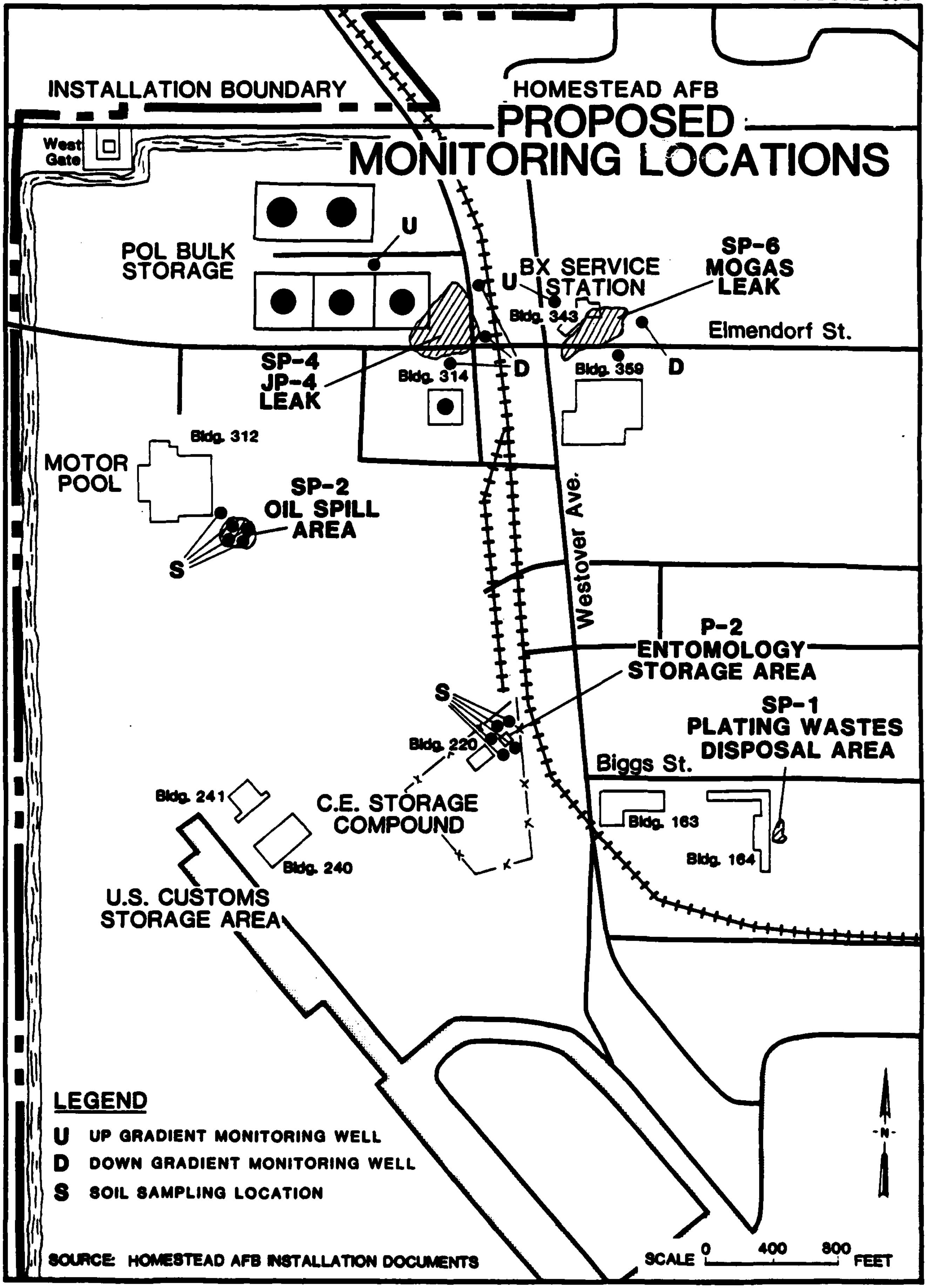
5) Fire Protection Training Area No. 2 (Figure 6.4) (FPTA-2) has a high potential for environmental contamination and monitoring of this site is recommended. Install three wells of Schedule 40 PVC, screened

TABLE 6.2
RECOMMENDED LIST OF ANALYTICAL PARAMETERS
HOMESTEAD AFB

List A	List B	List C	List D*	List E
pH	pH	pH	pH	pH
Total Dissolved Solids	Total Dissolved Solids	Total Dissolved Solids	Total Dissolved Solids	2,4,5-TP
Oil and Grease	Chromium	Oil and Grease	Oil and Grease	Chlordane
Total Organic Carbon	Nickel	Total Organic Carbon	Total Organic Carbon	DDT and its metabolates
Volatile Halocarbons	Copper	Phenols	Sulfate	Non-phosphate radical of carbaryl (sevin)
Volatile Aromatics	Sulfate	Volatile Halocarbons	Tetraethyl Lead	
		Volatile Aromatics		

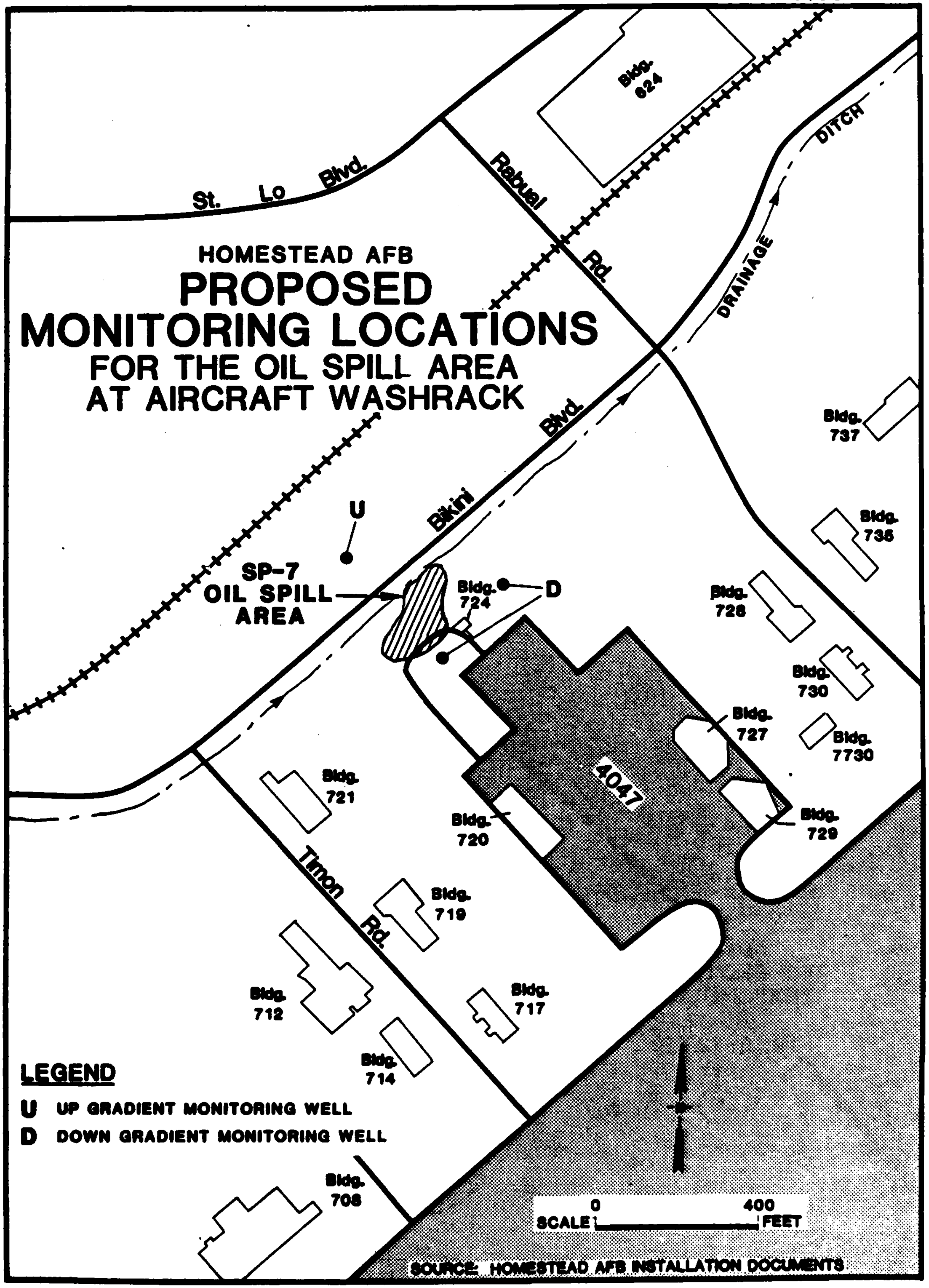
* Do not analyze for Tetraethyl Lead at the oil leakage site behind Motor Pool.

FIGURE 6.2



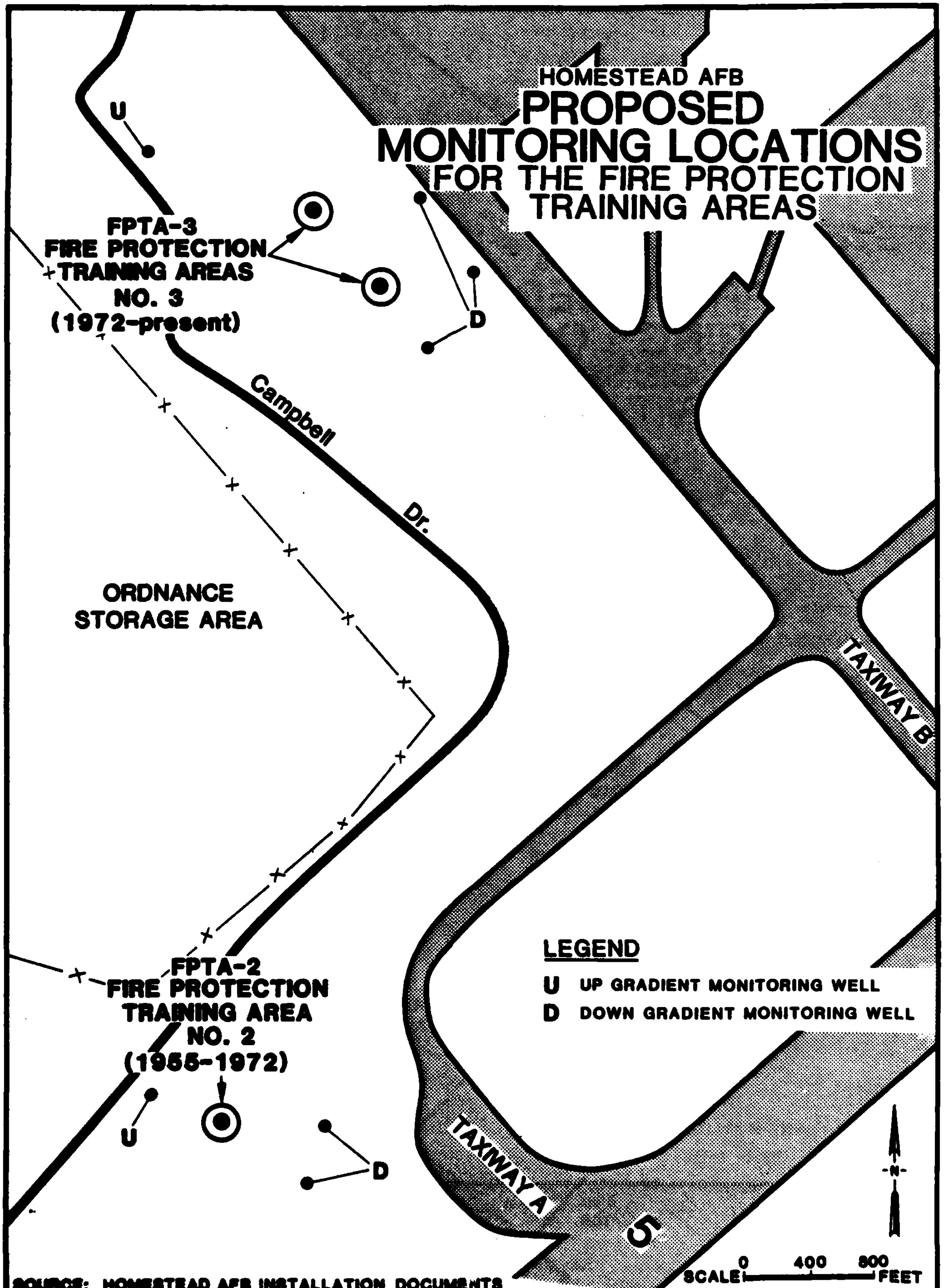
ES ENGINEERING-SCIENCE

FIGURE 6.3



ES ENGINEERING-SCIENCE

FIGURE 6.4



ES ENGINEERING-SCIENCE

10 to 15 feet deep so that well screens intercept the top of the saturated zone and permit sampling of floating contaminants, should they be present. One well should be installed upgradient, and two wells hydraulically downgradient of the subject site. Water samples should be obtained and analyzed for the parameters listed in Table 6.2, List C.

6) The MOGAS Leak at the BX Service Station (Figure 6.2) (SP-6) has a high potential for environmental contamination and monitoring of this site is recommended. A ground-water monitoring sysstem should be established to characterize the ground-water quality and identify any contaminant migration. One upgradient and two downgradient monitoring wells should be installed in the area. The wells should be constructed of Schedule 40 PVC, screened into the top of the water table (about 10 feet deep). Water samples should be collected and analyzed for the parameters in Table 6.2, List D. If contamination is detected, collect five local soil samples and analyze their water extract for the parameters in Table 6.2, List D.

7) The Entomology Storage Area at the Civil Engineering Storage Compound (Figure 6.2) (P-2) has a high potential for environmental contamination and monitoring of this site is recommended. Soil sampling should be carried out in five locations in the area and water extractions performed. Extract from the samples should be analyzed for the parameters in Table 6.2, List E.

8) The Oil Leakage behind the Motor Pool (Figure 6.2) (SP-2) has a high potential for environmental contamination and monitoring of this site is recommended. Soil sampling should be carried out in five locations in the area, including the nearby drainage ditch and one background sample. Water extractions will then be performed. Three surface-water samples from the drainage ditch, including one background sample, should also be collected. Surface-water samples and extract from the soil samples should be analyzed for the parameters in Table 6.2, List D.

RECOMMENDED GUIDELINES FOR LAND USE RESTRICTIONS

It is recommended that land use restrictions at the identified disposal and spill sites at Homestead AFB be considered. The purpose of such land use restrictions would be: (1) to provide the continued protection of human health, welfare, and the environment; (2) to insure that the migration of potential contaminants is not promoted through improper land uses; (3) to facilitate the compatible development of future USAF facilities; and (4) to allow for identification of property which may be proposed for excess or outlease.

The recommended guidelines for land use restrictions at each of the identified disposal and spill sites at Homestead AFB are presented in Table 6.3. A description of the land use restriction guidelines is presented in Table 6.4. Land use restrictions at sites recommended for Phase II monitoring should be reevaluated upon the completion of the Phase II monitoring program and changes made where appropriate.

TABLE 6.3
RECOMMENDED GUIDELINES FOR LAND USE RESTRICTIONS AT POTENTIAL CONTAMINATION SITES
HOMESTEAD AFB

Site No.	Site Name	Recommended Guidelines for Future Land Use Restrictions											
		Construction on the Site	Excavation	Well Construction on or near the Site	Agricultural Use	Silvicultural Use	Water Infiltration (run-on, ponding, irrigation)	Recreational Use	Burning or Ignition Source	Disposal Operations	Vehicular Traffic	Material Storage	Housing on or Near the Site
SP-4	Leak at POL Bulk Storage Tank Farm	X	X	X	X	-	X	X	X	X	-	NA	X
SP-1	Electroplating Waste Disposal Site	-	-	X	X	-	-	X	-	X	-	-	X
SP-7	Oil Spills at Aircraft Wash Rack	X	X	X	X	-	X	X	X	X	NA	NA	X
SP-2	Oil Leakage Behind Motor Pool	X	X	X	X	-	X	X	X	X	NA	NA	X
FPTA-3	Fire Protection Training Area No. 3	X	X	X	X	-	X	X	NA	X	NA	NA	X
FPTA-2	Fire Protection Training Area No. 2	X	X	X	X	-	X	X	X	X	-	-	X
SP-6	MOGAS Leak at BX Service Station	X	X	X	X	X	-	X	X	X	NA	NA	-
FPTA-1	Fire Protection Training Area No. 1	-	-	X	X	-	-	-	-	-	-	-	-
SP-5	Leak at Pump Station No. 9 on Flight Apron	X	X	X	X	X	X	X	X	X	NA	NA	X
P-3	Residual Pesticide Disposal Area	X	-	X	X	-	-	X	-	-	-	-	X
L-1	Landfill	X	X	X	X	X	-	X	-	X	-	-	X
SP-3	PCB Spill in Civil Engineering	-	-	-	X	-	-	-	-	-	-	NA	-
D-2	Incinerator Ash Disposal Area	-	-	-	-	-	-	-	-	-	-	-	-
P-2, P-1	Entomology Storage Areas	-	-	X	X	NA	X	X	-	-	-	NA	-

NOTE: "X" indicates a recommendation.
"-" indicates no recommendation.
"NA" indicates not applicable.

TABLE 6.4
DESCRIPTION OF GUIDELINES FOR LAND-USE RESTRICTIONS
HOMESTEAD AFB

Guidelines	Description
Construction on the site	Restrict the construction of structures which make permanent (or semi-permanent) and exclusive use of a portion of the site's surface.
Excavation	Restrict the disturbance of the cover or subsurface materials.
Well construction on or near the site	Restrict the placement of any wells (except for monitoring purposes) on or within a reasonably safe distance of the site. This distance will vary from site to site, based on prevailing soil conditions and ground-water flow.
Agricultural use	Restrict the use of the site for any and all agricultural purposes to prevent food chain contamination.
Silvicultural use	Restrict the use of the site for silvicultural uses (root structures could disturb cover or subsurface materials).
Water infiltration	Restrict water run-on, ponding and/or irrigation of the site. Water infiltration could produce contaminated leachate.
Recreational use	Restrict the use of the site for recreational purpose.
Burning or ignition sources	Restrict any and all unnecessary sources of ignition or open flame, due to the possible presence of flammable compounds.
Disposal operations	Restrict the use of the site for waste disposal operations, whether above or below ground.
Vehicular traffic	REstrict the passage of unnecessary vehicular traffic on the site dut to the presence of explosive material(s) and/or of an unstable surface.
Material storage	Restrict the storage of any and all liquid or solid materials on the site.
Housing on or nea he site	Restrict the use of housing structures on or within a reasonably safe distance of the site.

APPENDIX A

BIOGRAPHICAL DATA

J. R. Absalon, C.P.G.
D. S. Fry, P.E.
R. J. Reimer
E. J. Schroeder, P.E.

Biographical Data

JOHN R. ABSALON
Hydrogeologist

PII Redacted

[redacted]

Education

B.S. in Geology, 1973, Upsala College, East Orange, New Jersey

Professional Affiliations

Certified Professional Geologist (Indiana No. 46)
Association of Engineering Geologists
Geological Society of America
National Water Well Association

Experience Record

1973-1974 Soil Testing Incorporated-Drilling Contractors, Seymour, Connecticut. Geologist. Responsible for the planning and supervision of subsurface investigations supporting geotechnical, ground-water contamination, and mineral exploitation studies in the New England area. Also managed the office staff, drillers, and the maintenance shop.

1974-1975 William F. Loftus and Associates, Englewood Cliffs, New Jersey. Engineering Geologist. Responsible for planning and management of geotechnical investigations in the northeastern U.S. and Illinois. Other duties included formal report preparation.

1975-1978 U.S. Army Environmental Hygiene Agency, Fort McPherson, Georgia. Geologist. Responsible for performance of solid waste disposal facility siting studies, non-complying waste disposal site assessments, and ground-water monitoring programs at military installations in the southeastern U.S., Texas, and Oklahoma. Also responsible for operation and management of the soil mechanics laboratory.

1978-1980 Law Engineering Testing Company, Atlanta, Georgia. Engineering Geologist/Hydrogeologist. Responsible for the project supervision of waste management, water quality assessment, geotechnical, and hydrogeologic studies at commercial, industrial, and government

facilities. General experience included planning and management of several ground-water monitoring programs, development of remedial action programs, and formulation of waste disposal facility liner system design recommendations. Performed detailed ground-water quality investigations at an Air Force installation in Georgia, a paper mill in southwestern Georgia, and industrial facilities in Tennessee.

1980-Date Engineering-Science. Hydrogeologist. Responsible for supervising efforts in waste management, solid waste disposal, ground-water contamination assessment, leachate generation, and geotechnical and hydrogeologic investigations for clients in the industrial and governmental sectors. Performed geologic investigations at twelve Air Force bases and other industrial sites to evaluate the potential for migration of hazardous materials from past waste disposal practices. Conducted RCRA ground-water monitoring studies for industrial clients and evaluated remedial action alternatives for a county landfill in Florida. Conducted quality management, hydrogeologic and ground-water quality programs for the pulp and paper industry at several mills located in the Southeast United States.

Publications and Presentations

"An Investigation of the Brunswick Formation at Roseland, NJ," 1973, with others, The Bulletin, Vol 18, No. 1, NJ Academy of Science, Trenton, NJ.

"Engineering Geology of Fort Bliss, Texas," 1978, coauthor: R. Barksdale, in Terrain Analysis of Fort Bliss, Texas, US Army Topographic Laboratory, Fort Belvoir, VA.

"Geologic Aspects of Waste Disposal Site Evaluations," 1980, with others, Program and Abstracts AEG-ASCE Symposium on Hazardous Waste Disposal, April 26, Raleigh, NC.

"Practical Aspects of Ground-Water Monitoring at Existing Disposal Sites," 1980, coauthor: R.C. Starr, Proceedings of the EPA National Conference on Management of Uncontrolled Hazardous Sites, HMCRI, Silver Spring, MD.

"Improving the Reliability of Ground-Water Monitoring Systems," 1981, Proceedings of the Madison Conference of Applied Research and Practice on Municipal and Industrial Waste, University of Wisconsin-Extension, Madison, WI.

10.22
John R. Absalon (Continued)

Ground-Water Monitoring Workshop, 1982. Presented to Mississippi Bureau of Pollution Control, Jackson, 15-17 February.

Ground-Water Monitoring Workshop, 1982. Presented to Alabama Division of Solid and Hazardous Waste, Huntsville, 20-21 July.

Ground-Water Monitoring Workshop, 1982. Presented to Kentucky Waste Management Division, Bowling Green, 27-28 July.

"Identification and Treatment Alternatives Evaluation for Contaminated Ground Water," 1982, coauthor: M. R. Hockenbury. Presented to Association of Engineering Geologists Symposium on Hazardous Waste Disposal, Atlanta, 17 September.

"Preliminary Assessment of Past Waste Storage and Disposal Sites," 1982, coauthor: W. G. Christopher. Presented to Association of Engineering Geologists Symposium on Hazardous Waste Disposal, Atlanta, 17 September.

Biographical Data

DONALD S. FRY

Civil Engineer

PII Redacted

[redacted]

Education

B.S. in Civil Engineering, 1975, University of Maryland, College Park, Maryland
Sanitary Engineering, 1977, University of Maryland

Professional Affiliations

Registered Professional Engineer (Georgia No. 12143)
American Society of Civil Engineers
Water Pollution Control Federation

Professional Activities

Advisory Board, Design Compudata Exchange Newsletter

Honorary Affiliation

Chi Epsilon

Experience Record

1974 — Engineering-Science. Field and Laboratory Technician. Responsible for design, construction, and operation of advanced waste treatment pilot units. Performed wastewater analysis utilizing standard laboratory methods.

1975-1977 — J.R. McCrone, Jr., Inc., Annapolis, Maryland. Project Engineer. Responsible for design of public works and private development projects. Projects on which Mr. Fry had primary design responsibility included highway and road design for Anne Arundel County, Maryland; structural and civil design of a bridge spanning the Elk River for the City of Elkton, Maryland; and design of water treatment structures for Anne Arundel County.

Other projects included numerous roads, bridges, subdivisions, foundations, and waste disposal landfills; shop drawing reviews, commercial and industrial site plans, hydrologic and hydraulic studies including flood plain and wetland assessment and design, design of flood routing, sediment, and erosion control structures, storm drainage network design; utility layout and design, and structural

Donald S. Fry (Continued)

design of numerous steel and concrete structures. Supervised field surveys for civil design projects and hydrologic studies, and developed computer models for geometric control of civil design projects.

1977-Date Engineering-Science. Field Engineer. Responsible for operation of pilot plant used to evaluate advanced wastewater technologies of textile mill BPT effluents for an EPA/American Textile Manufacturers Institute Project.

Project Engineer. Responsible for design of the interim hazardous waste disposal facilities for Salsbury Laboratories in Charles City, Iowa. Designed the interim chlorination facilities for the 100 mgd Cleveland Westerly AWT plant; a 12 mgd pump station with six miles of transmission main and the preliminary plan for equalization facilities for the Flint River Water Pollution Control Plant for the City of Atlanta. Other project activities include designs for Owens-Corning Fiberglas; 36,000 gpm neutralization facilities for FMC Corporation; wastewater reclamation facilities for Madras, India; several American Cyanamid projects including a carbon adsorption AWT facility; and numerous waste landfills for both hazardous and nonhazardous waste disposal, including design of landfills in wetlands, flood plains and other environmentally sensitive areas.

Project Manager. Responsible for developing preliminary designs and cost estimates for AWT BATEA facilities for existing textile industry waste treatment plants including Bigelow Carpet Mills and Blair Mills. Director of regional construction project cost estimates and the regional computer facilities. Creator of numerous software applications programs including storm flow retention/equalization pond sizing model, information management systems, design models, analytical models, cost estimating and material takeoff programs, and project management models. Experience has included work with various hardware, including the IBM 1130, UNIVAC 1108-1106, DEC PDP-11's and PDP-8's and the VAX 11/780, APPLE][, and the IBM 5150.

#67

Biographical Data

ROBERT J. REIMER

PII Redacted

Chemical Engineer

[redacted]

Education

B.S. in Chemical Engineering, 1979, University of Notre Dame
B.A. in Art, 1979, University of Notre Dame
M.S. in Chemical Engineering, 1980, University of Notre Dame

Honors

Amoco Company Fellowship for Graduate Studies in Chemical Engineering, University of Notre Dame (1979-1980)

Professional Affiliations

American Institute of Chemical Engineers

Experience Record

1978-1979 PEDCo Environmental, Cincinnati. Engineer's Assistant. Responsible for compilation of data base report reviewing solid waste disposal in the nonferrous smelting industry. Participated in SO_2 scrubber emissions testing program, Columbus, Ohio. Worked on team establishing a computerized reference file on the overall smelting industry. Performed technical editing and report review.

1979-1980 Camargo Associates, Ltd., Cincinnati. Design Engineer and Draftsman. Responsible for HVAC design on numerous projects. Designed fire protection system for an industrial plastics press. Designer on various general plumbing jobs. Prepared EPA air pollution permit applications.

1980-Date Engineering-Science. Chemical Engineer. Responsible for the preparation of environmental reports and permit documents as well as providing general environmental assistance to clients to assure compliance with state and federal regulations.

3/83

Robert J. Reimer (Continued)

1980-Date Developed cost estimates for several hazardous waste management facility closures. Prepared several Interim Status Standards Manuals, including Manifest Plans, Waste Analysis Plans, Closure Plans and Contingency/ Emergency Plans. Provided technical assistance in the design of a one-million gallon per year fuel alcohol production facility.

Provided assistance for a water reuse/reduction plan at a major petroleum refinery. Conducted an extensive review of emerging energy technologies for the Department of Energy. Participated in several Installation Restoration Programs for the U. S. Air Force. Assisted in the design of a contaminated ground water air stripping column based on a lab model to be developed. Prepared several delisting petitions for the removal of industrial wastestreams from EPA's hazardous waste list. Assisted in a study of waste oil reuse for the U.S. Army CERL.

#10.8

Biographical Data

ERNEST J. SCHROEDER

Environmental Engineer
Manager, Solid and Hazardous Waste

PII Redacted

[redacted]

Education

B.S. in Civil Engineering, 1966, University of Arkansas, Fayetteville, Arkansas
M.S. in Sanitary Engineering, 1967, University of Arkansas, Fayetteville, Arkansas

Professional Affiliations

Registered Professional Engineer (Arkansas No. 3259, Georgia No. 10618, Texas No. 33556 and Florida No. 0029175)
Water Pollution Control Federation
American Academy of Environmental Engineers

Honorary Affiliations

Chi Epsilon

Experience Record

1967-1976 Union Carbide Technical Center, Engineering Department, South Charleston, West Virginia (1967-1968). Project Engineer. Responsible for environmental protection engineering projects for various organic chemicals and plastics plants. Conducted industrial waste surveys, landfill design, and planning for plant environmental protection programs; evaluated air pollution discharges from new sources; reviewed a wastewater treatment plant design; and participated on a project team to design a new chemical unit.

Union Carbide Corporation, Environmental Protection Department, Texas City, Texas (1969-1975). Project Engineer and Engineering Supervisor. Responsible for various aspects of plant pollution abatement programs, including preparation of state and federal permits for wastewater treatment activities.

5/83

#10.8
ERNEST J. SCHROEDER (Continued)

Operations Representative on $8 million regional wastewater treatment project and member of design team which made the initial site selection and process evaluation and recommendation. Participated in contract negotiations, process and detailed engineering design, construction of the facilities, preparation of start-up manuals, operator training, and the start-up activities. Designated as Project Engineer after start-up on expansion to original waste treatment unit.

Engineering Supervisor responsible for operation of wastewater treatment facilities including collection system, sampling and monitoring programs, spill control and clean-up, primary waste treatment, wastewater transfer system, biological waste treatment, and waste treatment pilot plants. Developed odor control program which successfully reduced odor emissions and represented Union Carbide at a public hearing on community odor problems.

Led special projects such as an excess loss control program to reduce water pollution losses; sewer segregation program involving coordination and reporting of 38 projects for the separation of contaminated and non-contaminated water; and sludge disposal program to develop long-term sludge disposal alternatives and recover land in present sludge landfill area. Developed improved methods of sampling and continuous monitoring of wastewater.

Union Carbide Corporation, Environmental Protection Project Engineer, Toronto, Ontario, Canada (1975-1976). Responsible for the overall environmental permitting, engineering design, construction and start-up of waste treatment systems associated with a new refinery.

1976-Date Engineering-Science, Inc., Project Manager (1976-1978). Responsible for several industrial wastewater projects including the following: wastewater investigation to characterize sources of waste streams in a chemical plant and to develop methods to reduce the wastes, sludge settling studies to evaluate settling characteristics of activated sludge at a chemical plant, development of a process document for the design and operation of a wastewater treatment facility at a petrochemical complex, wastewater treatment evaluation which included characterization of wastewater, unit process evaluation, inhibition studies, design review, operations review, preparation of operations manual, operator training and providing operating assistance for waste treatment facilities, various biological treatability studies and bench-scale and pilot-scale evaluation of advanced waste treatment technologies such as granular carbon adsorption, multimedia filtration, powdered activated carbon treatment, ion exchange and ozonation.

#10.8
ERNEST J. SCHROEDER (Continued)

Project Manager for hazardous waste disposal projects involving waste characterization, development of criteria for disposal of hazardous waste, site investigation, preparation of permits, detailed design, construction of facilities and spill clean-up activities.

Deputy Project Manager for industry-wide pilot plant study of advanced waste treatment in the textile industry. Technologies evaluated included coagulation/clarification, multi-media filtration, granular carbon adsorption, powdered activated carbon treatment, ozonation and dissolved air flotation.

Engineering-Science, Inc., Manager of the Industrial Waste Group in the Atlanta, Georgia office (1978-1980). Responsible for the supervision of industrial waste project managers and project engineers and the management of industrial waste studies conducted in the office. Also directly involved in project management consulting with clients on environmental studies and environment assessment projects, e.g., project manager for several spill control and wastewater treatability projects and for a third-party EIS for a new phosphate mine in Florida.

Engineering-Science, Inc., Manager of Solid and Hazardous Waste Group in the Atlanta, Georgia office (1980-date). Responsible for the supervision of solid and hazardous waste project managers and project engineers and the management of solid and hazardous waste projects in the office. Project activities have included permit and regulatory assistance, environmental audits, waste management program development, delisting partitions, ground-water monitoring, landfill evaluations, landfill closure design, hazardous waste management, waste inventory, waste recovery/recycle evaluation, waste disposal alternative evaluation, transportation evaluation, and spill control and countermeasure planning.

Project Manager for eight Phase I Installation Restoration Program projects for the U.S. Air Force. The objective of this program is to audit past hazardous waste disposal practices that could result in migration of contaminants and recommend priority sites requiring further investigation. Also conducted environmental audits (air, water and solid waste) at several industrial facilities. Project manager for a contamination assessment and site cleanup being conducted for an industrial client as part of a consent degree agreement.

#10.8
ERNEST J. SCHROEDER (Continued)

Publications and Presentations

Schroeder, E. J., "Filamentous Activated Sludge Treatment of Nitrogen Deficient Waste," research paper submitted in partial fulfillment of the requirements for MSCE degree, 1967.

Schroeder, E. J. and Loven, A. W., "Activated Carbon Adsorption for Textile Wastewater Pollution Control," Symposium Proceedings: Textile Industry Technology, December 1978, Williamsburg, VA.

Schroeder, E. J., "Summary Report of the BATEA Guidelines (1974) Study for the Textile Industry," North Carolina Section of AWWA/ WPCA, Pinehurst, North Carolina, November 1979.

Mayfield, R. E., Sargent, T. N. and Schroeder, E. J., "Evaluation of BATEA Guidelines (1974) Textiles," U.S. EPA Report, Grant No. R-804329, February 1980.

Storey, W. A. and Schroeder, E. J., "Pilot Plant Evaluation of the 1974 BATEA Guidelines for the Textile Industry," Proceedings of the 35th Industrial Waste Conference, Purdue University, May 1980.

Pope, R. L., and Schroeder, E. J., 'Treatment of Textile Wastewaters Using Activated Sludge With Powdered Activated Carbon," U.S. EPA Report, Grant No. R-804329, December 1980.

Schroeder, E. J., "Industrial Solid Waste Management Program to Comply with RCRA," Engineering Short Course Instructor, Auburn University, October 1980.

Schroeder, E. J., "Technical and Economic Impact of RCRA on Industrial Solid Waste Management, Florida Section, American Chemical Society, May 1981.

Schroeder, E. J. and Sargent, T. N., "Hazardous Waste Site Rating Systems," Textile Wastewater Treatment and Air Pollution Control Conference, January 1983.

APPENDIX B

LIST OF INTERVIEWEES AND OUTSIDE AGENCIES

APPENDIX B

LIST OF INTERVIEWEES AND OUTSIDE AGENCIES

TABLE B.1
LIST OF INTERVIEWEES

	Position	Period of Service
1.	Resident Engineer, US Army Corps of Engineers	1981-present
2.	Chief Water Treatment Plant, 31 CES	1963-present
3.	Water Treatment Plant Operator, 31 CES	1971-present
4.	NCO, Bioenvironmental Engineering Services, USAF/HOSP	1982-present
5.	NCOIC, Corrosion Control, 31 EMS	1980-present
6.	Asst. NCOIC, Liquid Fuels Management, 31 CES	1982-present
7.	NCOIC, Exterior Electric, 31 CES	1982-present
8.	NCOIC, Power Production, 31 CES	1981-present
9.	Civilian, Power Production, 31 CES	1979-present
10.	NCOIC, Wheel and Tire Shop, 31 EMS	1960-present
11.	Civilian Supervisor, ISO Docks, 31 EMS	1970's-present
12.	Civilian Supervisor, Auto Hobby Shop, MWR	1973-present
13.	NCOIC, Vehicle Maintenance, 31 TRANS	1972-present
14.	Civilian Supervisor, Fire Extingisher Maintenance, 31 CES	1973-present
15.	Civilian Supervisor, Refueling Maintenance, 31 TRANS	1967-present
16.	NCOIC, Fuel Lab, 31 Supply	1982-present
17.	Asst. NCOIC, Corrosion Control, 31 EMS	1981-present
18.	NCOIC, Aircraft Maintenance, 31 EMS	1980-present
19.	NCOIC, Pneudraulics Shop, 31 CRS	1982-present

TABLE B.1 (Continued)

	Position	Period of Service
20.	NCOIC, Battery Shop, 31 CRS	1982-present
21.	NCOIC, OLAM	1982-present
22.	NCOIC, OLAK	1980-present
23.	Civilian, DPDO Receiving	1973-present
24.	NCOIC, Key Largo	1982-present
25.	NCOIC, Engine Shop, 31 CRS	1981-present
26.	Deputy Base Civil Engineer, 31 CES	1953-present
27.	Fire Chief, 31 CES	1971-present
28.	NCO, Explosive Ordnance Disposal Operations, 31 EMS	1975-present
29.	Engineering Draftsman, 31 CES	1952-present
30.	Sewage Treatment Plant Superintendent, 31 CES	1963-present
31.	Post Engineer, County Caretaker (Retired)	1942-1953
32.	Safety Officer, 31 TTW	1973-present
33.	Property Marketing Specialist, DPDO	1955-present
34.	Base Entomologist, 31 CES	1976-present
35.	Base Environmental Coordinator, 31 CES	1976-present
36.	Real Property Officer, 31 CES	1972-present
37.	Communications Maintenance Foreman, 31 TTW	1977-present
38.	Deputy Fire Chief, 31 CES	1982-present
39.	Base Historian, 31 TTW	1969-present
40.	Chief of Contract Management, 31 CES	1980-present
41.	Waste Leader, Fuels Management, 31 Supply (LGSF)	1981-present
42.	NCO, Fuels Management 31 Supply (LGSF)	1980-present
43.	Deputy Chief of Operations, 31 CES	1964-present
44.	Supervisor Pavement and Grounds, 31 CES	1957-present

TABLE B.1 (Continued)

	Position	Period of Service
45.	NCOIC, Water Survival School, 3613 CCTS	1971-present
46.	NCOIC Dispatcher, Fuels Management, 31 Supply (LGSF)	1971-present
47.	Superintendent, Vehicle Maintenance, 31 TRANS (LGTM)	1967-present
48.	Chief, Sewage Treatment Plant, 31 CES	1963-present
49.	Base Bioenvironmental Engineer, USAF HOSP	1972-1976
50.	Wastewater Treatment Plant Operator, 31 CES	1959-present
51.	Base Bioenvironmental Engineer	1982-present
52.	Superintendent Power Department, 31 CES	1963-present
53.	BX Service Station Manager	1981-present
54.	Base Civil Engineer, 31 CES	1982-present
55.	Supervisor, Liquid Fuels Management, 31 Supply (LGSF)	1964-1981
56.	NCOIC Corrosion Control, 31 EMS	1980-present
57.	High Voltage Electrician, 31 CES	1968-present
58.	Assistant Supply Chief, 31 Supply (LGS)	1956-present
59.	BX Service Station Foreman	1982-present

TABLE B.2

OUTSIDE AGENCIES

1. Leo Swayze, Hydrologist, US Geological Survey, (305)261-5382, Miami, FL.

2. Howard Klein, Hydrologist, US Geological Survey, (305)261-5382, Miami, FL.

3. Douglas Yoder, Assistant Director, Dade County DERM, (305)579-2760, Miami, FL.

4. Rick Fraxadis, Chief, Hazardous Waste Div., Dade County DERM, (305)579-2760, Miami, FL.

5. George Rodriguez, Chief, Water and Sewer Div., Dade County DERM, (305)579-2760, Miami, FL.

6. Rafael Rodom, Chief, Environmental Planning, Dade County DERM, (305)579-2760, Miami, FL.

7. Abe Kreitman, Director, Ground Water Div., South Florida Water Mgt. District, (305)686-8800, Miami, FL.

8. Engineer, Florida Dept. Environmental Regulation (FDER), Southeast Florida District Office, (305)689-5800, Miami, FL.

9. Larry O'Donnell, Supervisor, Dredge & Fill Section, FDER, (305)689-5800, Miami, FL.

10. John Guidry, Supervisor, Solid & Industrial Waste Section, FDER, (305)689-5800, Miami, FL.

APPENDIX C

TENANT ORGANIZATION AND MISSIONS

APPENDIX C
TENANT ORGANIZATIONS AND MISSIONS

PRIMARY ORGANIZATION AND MISSION

The mission of the 31st Tactical Training Wing (31st TTW) of the Tactical Air Command (TAC), host unit at Homestead AFB, consists of three major functions:

1. Conduct Replacement Training Unit (RTU) operations for training of combat qualified aircrews in the F-4D Phantom II,
2. Command and operate Homestead AFB, and
3. Support designated tenant organizations.

TENANT ORGANIZATIONS AND MISSIONS

Homestead AFB is host to several tenant organizations. The following list identifies the major tenant organizations; included is a brief description of their respective missions.

<u>915th Airborne Early Warning and Control Group (AFRES)</u>

The mission of the 915th AEW&C GP is to achieve, through training, the capability to: provide airborne early warning and control in the air defense combat zone; support the operations of other command when directed by higher headquarters; participate in the USAF anti-submarine warfare program; augment Air Weather Service reconnaissance by observing, recording, and transmitting weather information; and assist Air Rescue Service and the Coast Guard by providing radar coverage over the high seas.

<u>301st Aerospace Rescue and Recovery Squadron (AFRES)</u>

The mission of the 301st ARRS is to train reserve crew members to provide search and rescue service within an assigned area of responsibility for the Air Force and other United States military forces as directed by appropriate authority.

<u>3613 Combat Crew Training School (ATC)</u>

The mission of the 3613 CCTS (Water Survival School) is to provide aircrew personnel with training which will increase their ability to survive in the sea environment under emergency conditions.

<u>Det. 1, 40th Aerospace Rescue and Recovery Wing (MAC)</u>

This detachment flies the UH-1N "Huey" helicopter, providing alert rescue service for the flying activities of Homestead AFB. In addition to search and rescue of personnel involved in aircraft accidents, it supports the 3613th Combat Crew Training School and provides emergency medevac services of both military and civilian personnel in south Florida.

<u>319th Field Training Detachment (ATC)</u>

This unit provides job-oriented aircraft maintenance training on the F-4 including training on auto-pilot, instruments, navigation, fire control systems, radar, jet engine systems, aerospace ground equipment, and crew chief duties.

1942nd Communications Squadron (AFCC)

Communications and air traffic control are provided by this unit, which operates and maintains air navigation aids and provides air traffic controllers. It also provides the communications electronics staff element for the 31st TTW, as well as base communications facilities including telephones, radios, public address systems, switchboard operations, and message center operations.

726th Tactical Control Squadron

This unit is responsible for maintaining a combat ready control and reporting post in support of the Tactical Air Control System. It controls the offensive and defensive missions of the 31st TTW through its radar and communications equipment.

U.S. Navy Security Group Activity

The command operates a communications facility in support of the Department of Defense. Company H Marine Support Battalion is stationed with the security group.

6947th Security Squadron

This unit provides rapid radio relay and secure communications for Department of Defense activities. Additional activities include monitoring transmission security procedures and conducting research into electronic phenomena.

Det. 7, 4400 Management Engineering Squadron

This detachment is responsible for the development of manpower standards through the conduct of standards development studies in various functional areas. In addition, the detachment renders assistance to local commanders, staff officers, and supervisors in the areas of manpower organization and management consultant services.

Det. 6, 3rd Weather Squadron

A unit of the Military Airlift Command's Air Weather Service, this detachment operates a complete meteorological facility, providing the 31st TTW and tenant units with compete up-to-the-minute weather reports.

U.S. Air Force Hospital, Homestead

The hospital provides complete medical care for active duty and retired military personnel and their dependents. Services provided at the 85-bed inpatient and outpatient facilities include family practice, surgery, orthopedics, obstetrics, gynecology, dentistry, psychiatry, and veterinary medicine.

Other Tenant Units at Homestead AFB Include:

USAF Area Audit Office (AFAA)
USAF Element/Project Administration Support
American Red Cross
OL1B A.F. Commissary Service
Defense Investigation Service, Miami Field Office
Defense Property Disposal Office (DPDO)
Det 3, OLAK, 20th Air Defense Squadron (located at Richmond AFS)
Det 4, OLAM, 20th Air Defense Squadron (located at Cudjoe Key)
Det 707, USAF Office of Special Investigations, District 7
Field Training Detachment 319 (ATC)
US Navy Personnel Support Activity
US Army Criminal Investigation (CID)
US Army Corps of Engineers
US Customs Service
US Postal Branch, Homestead
United Services Organization
US Army 24th Infantry Division (Mechanics)
USAF Trial Judiciary, Area Defense Counsel
482nd Tactical Fighter Wing (AFRES)
70th Aerial Port Sqaudron (AFRES)
90th Aerial Port Squadron (AFRES)
93rd Tactical Fighter Squadron
US Air Force Water Survival School

APPENDIX D

SUPPLEMENTAL BASE FINDINGS INFORMATION

TABLE D.1
PESTICIDES STORED AT HOMESTEAD AFB

Vaponite 2EC
Wasp Freeze
Ficam W (bendiocarb)
malathion 95%
Cynthion 57%
baygon strips
baygon 1.5%
Dibrom (85% Naled)
Dursban Granules 0.5% (chlopyrifos)
Dursban 4E
Inspector PT 565
Knox-Out 2FM (Diazinon)
baygon bait
Precor 5E
Talon-G
Baytex
d-Phenothrin (spray cans)
Nemacur
Seven (carbaryl)
Kelthane MF
Dowfume MC-2 (methyl bromide)
Phostoxin (aluminum phosphide)
chloropicrin
SA-77, Cide Kick
Nalco-Trol
Dal-e-rad
Velpar
Hyvar X (bromacil)
diquat
Aquazine (simazine)
Balan
Banvel 720
Pramitol 5PS
paraquat
Eptam 7-E
Round-Up (glyphosphate)
Karmex (diuron)
AATREX
Promitol 25e
Asulox
Dowpon (dalapon)
Dithane M-45
Fungo 50 (methyl thiophanate)
Tersan 1991 (benomyl)

Note: Capitalization of the first letter indicates that the name is a registered trade mark.

TABLE D.2
WATER QUALITY MONITORING DATA
MILITARY CANAL
STATION NO. 2

Date	Sodium	Chloride	Residue (TDS)	Residue (SS)	Specific Conductance	Surfactants MBAS as LAS	Turbidity	Total Coliform	Sulfide	Fluoride
6 May 77	—	76	—	—	620	<0.1	—	1:100 30	—	—
8 Nov 77	—	67	—	—	670	1.55	—	—	—	—
3 May 78	—	88	508	—	740	0.3	<1	—	<.05	0.2
9 Nov 78	—	80	438	—	720	0.1	3	1:1000 281	<.1	0.4
8 May 79	—	116	438	—	670	0.1	2	1:1000 0	<0.1	0.2
20 Nov 79	—	72	795	—	810	<0.1	2	75	<.1	<.1
20 May 80	—	136	579	—	830	0.2	2	1:100 90	<.10	0.2
18 Nov 80	—	24	242	—	340	<.1	1	1:100 60	<.05	0.1
7 May 81	—	688	1,719	—	1,800	0.2	2	1:100 10	<.05	0.2
9 Nov 81	—	132	425	—	670	<0.1	<1	1	<0.1	<0.1
7 Jun 82	113.9	136	649	—	850	<.1	<1	0	—	0.2
22 Nov 82	30.5	52	360	—	570	<.1	1	0	—	0.1

NOTE: All units are (mg/l) except Sp. Conductance (umhos).

TABLE D.3
WATER QUALITY MONITORING DATA
MILITARY CANAL
STATION NO. 3

Date	Oils & Grease (mg/l)	Ammonia as N (mg/l)	Phosphorus as P (mg/l)	Cyanide (mg/l)	Phenols (ug/l)	Arsenic (ug/l)	Chromium (ug/l)	Copper (ug/l)	Iron (ug/l)	Lead (ug/l)	Mercury (ug/l)	Zinc (ug/l)
6 May 77	--	--	0.4	--	<10	--	--	--	--	--	<5	--
8 Nov 77	--	--	1.8	--	<10	--	<50	<20	<100	<50	<5	--
3 May 78	1.4	5.2	1.5	<.01	10	<10	<50	<20	130	<50	<5	380
9 Nov 78	0.4	1.8	1.6	<.01	<10	<10	<50	<20	<100	54	<5	<50
8 May 79	0.4	<.2	0.4	<.01	<10	<10	<50	56	<100	<50	<5	120
20 Nov 79	<0.3	<.2	<.2	.10	<10	<10	<50	<20	<100	<50	<5	<50
20 May 80	<0.3	0.3	0.5	<.01	<10	<10	<50	27	<100	<50	<5	184
18 Nov 80	<0.3	0.2	<.2	<.01	<10	<10	<50	50	<100	<50	<5	<50
7 May 81	<.3	1.1	1.7	.03	<10	<10	<50	51	<100	<50	<5	92
9 Nov 81	0.4	0.3	.24	.03	<10	11	<50	23	<100	<50	<5	103
7 Jun 82	0.5	.25	.60	.01	<10	<10	<50	80	100	<50	<5	<50
22 Nov 82	0.6	<.2	0.5	<.01	<10	<10	<50	<20	<100	<50	<5	81

TABLE D.4
WATER QUALITY MONITORING DATA
STORM WATER RESERVOIR

Date	Oils & Grease (mg/l)	Ammonia as N (mg/l)	Phosphorus as P (mg/l)	Cyanide (mg/l)	Phenols (ug/l)	Arsenic (ug/l)	Chromium (ug/l)	Copper (ug/l)	Iron (ug/l)	Lead (ug/l)	Mercury (ug/l)	Zinc (ug/l)
6 May 77	--	--	<.1	--	<10	--	--	<20	--	--	--	--
8 Nov 77	--	--	0.8	--	<10	--	<50	<20	<100	<50	<5	--
3 May 78	<.3	<.2	0.8	<.01	<10	<10	<50	<20	<100	<50	<5	<50
9 Nov 78	0.4	<.2	1.1	<.01	<10	<10	<50	<20	<100	<50	<5	<50
8 May 79	0.4	<.2	<.2	<.01	<10	<10	<50	40	<100	<50	<5	<50
20 Nov 79	<.3	.4	.34	.19	10	<10	<50	<20	<100	<50	<5	<50
20 May 80	<.3	<.2	0.4	<.01	<10	<10	<50	<20	134	<50	<5	184
18 Nov 80	<.3	0.3	0.3	<.01	<10	<10	<50	60	<100	<50	<5	<50
7 May 81	--	1.7	1.7	.02	<10	<10	<50	176	<100	<50	<5	55
9 Nov 81	0.4	0.3	<.1	.03	<10	<10	<50	<20	<100	<50	<5	<50
7 Jun 82	--	>.2	.44	<.01	<10	<10	<50	50	<100	<50	<5	61
21 Sep 82	<.3	--	--	--	--	--	--	--	--	--	--	--
22 Nov 82	--	<.2	.18	<.01	<10	<10	<50	<20	<100	<50	<5	51

TABLE D.5
WATER QUALITY MONITORING DATA
STORM WATER RESERVOIR

Date	Sodium	Chloride	Residue (TDS)	Residue (SS)	Specific Conductance	Surfactants MBAS as LAS	Turbidity	Total Coliform	Sulfide	Fluoride
6 May 77	—	60	—	—	440	0.1	—	—	—	—
8 Nov 77	—	63	—	—	620	.3	—	—	—	—
3 May 78	—	204	620	—	830	.1	<1	—	<.05	0.1
9 Nov 78	—	112	452	—	770	<.1	1	1:100 40 col.	<.1	0.2
8 May 79	—	72	362	—	570	<.1	<1	0 col.	<0.1	0.1
20 Nov 79	—	88	439	—	740	<.1	1	80 col.	<0.1	<.1
20 May 80	—	116	506	—	730	0.2	2	1:100 10 col.	<.1	0.2
18 Nov 80	—	68	338	—	530	<.1	1	1:100 8 col.	<0.5	0.1
7 May 81	—	364	1,227	—	1,260	<.1	4	1:100 27 col.	<.05	0.2
9 Nov 81	—	32	257	—	400	<.1	<1	10 col.	<.1	<0.1
7 Jun 82	66.7	128	532	—	780	<.1	<1	0	—	0.2
22 Nov 82	29.3	92	349	—	550	<.1	2	0	—	0.1

NOTE: All units are (mg/l) except Sp. Conductance (umhos).

TABLE D.6
STORAGE TANKS

Facility Numbers	Type of Fuel	Capacity (gal)	Above or Below Ground	Diked
330	JP-4	826,000	Above	Yes
331	JP-4	826,000	Above	Yes
332	JP-4	826,000	Above	Yes
840	JP-4	50,000	Below	No
840	JP-4	50,000	Below	No
840	JP-4	50,000	Below	No
845	JP-4	50,000	Below	No
845	JP-4	50,000	Below	No
845	JP-4	50,000	Below	No
845	JP-4	50,000	Below	No
845	JP-4	50,000	Below	No
845	JP-4	50,000	Below	No
850	JP-4	50,000	Below	No
850	JP-4	50,000	Below	No
850	JP-4	50,000	Below	No
850	JP-4	50,000	Below	No
850	JP-4	50,000	Below	No
850	JP-4	50,000	Below	No
855	JP-4	50,000	Below	No
855	JP-4	50,000	Below	No
855	JP-4	50,000	Below	No
855	JP-4	50,000	Below	No
855	JP-4	50,000	Below	No
855	JP-4	50,000	Below	No
857	JP-4	50,000	Below	No
857	JP-4	50,000	Below	No
857	JP-4	50,000	Below	No
857	JP-4	50,000	Below	No
860	JP-4	50,000	Below	No
860	JP-4	50,000	Below	No
860	JP-4	50,000	Below	No
860	JP-4	50,000	Below	No
860	JP-4	50,000	Below	No
860	JP-4	50,000	Below	No
865	JP-4	50,000	Below	No
865	JP-4	50,000	Below	No
865	JP-4	50,000	Below	No
865	JP-4	50,000	Below	No
865	JP-4	50,000	Below	No
865	JP-4	50,000	Below	No
880	JP-4	50,000	Below	No
880	JP-4	50,000	Below	No
880	JP-4	50,000	Below	No
880	JP-4	50,000	Below	No
880	JP-4	50,000	Below	No
880	JP-4	50,000	Below	No

TABLE D.6
(Continued)
STORAGE TANKS

Facility Numbers	Type of Fuel	Capacity (gal)	Above or Below Ground	Diked
890	JP-4	50,000	Below	No
890	JP-4	50,000	Below	No
890	JP-4	50,000	Below	No
890	JP-4	50,000	Below	No
890	JP-4	50,000	Below	No
890	JP-4	50,000	Below	No
840	JP-4	50,000	Below	No
840	JP-4	50,000	Below	No
840	JP-4	50,000	Below	No
314	JP-4	420,000	Above	Yes
207	Mogas	12,000	Below	No
207	Mogas	12,000	Below	No
840	JP-4	2,000	Below	No
845	JP-4	2,000	Below	No
850	JP-4	2,000	Below	No
855	JP-4	2,000	Below	No
857	JP-4	2,000	Below	No
860	JP-4	2,000	Below	No
865	JP-4	2,000	Below	No
880	JP-4	2,000	Below	No
890	JP-4	2,000	Below	No
231	Not in Use	25,000	Below	No
231	Not in Use	25,000	Below	No
231	Not in Use	25,000	Below	No
231	Not in Use	12,000	Below	No
207	Mogas	11,500	Below	No
207	Mogas	11,700	Below	No
171	Diesel	11,700	Below	No
195	Mogas	9,250	Below	No
195	Mogas, Unl.	9,250	Below	No
195	Diesel	1,000	Above	
723	Not In Use	1,500	Above	Yes
211	Diesel	2,000	Below	No
875	Diesel	500	Above	Yes
267	Diesel	55	Above	
373		200	Above	
587		300	Above	
712		60	Above	
706	Gasoline	250	Above	No
810	Diesel	275	Below	
893	Diesel	275	Below	
682	Diesel	750	Above	No
030	Diesel	1,000	Above	No
290	Diesel	500	Above	
843	Diesel	400	Above	No

TABLE D.6
(Continued)
STORAGE TANKS

Facility Numbers	Type of Fuel	Capacity (gal)	Above or Below Ground	Diked
990	Diesel	1,000	Above	
531	Diesel	1,000	Above	No
351	Diesel	750	Above	No
354	Diesel	250	Below	
702	Diesel	400	Above	No
801	Diesel	300	Below	
858	Diesel	750	Above	No
990	Diesel	1,500	Below	
705	Diesel	2,000	Above	No
289	Diesel	3,000	Below	
721		100	Above	
817		750	Above	
739	Diesel	750	Above	
870		300	Above	
931		575	Above	
769		2,500	Below	

TABLE D.7
NO. 2 FUEL OIL STORAGE TANKS

Facility Numbers	Type of Fuel	Capacity (gal)	Above or Below Ground	Diked
101	#2 Fuel Oil	2,000	Below	No
137	#2 Fuel Oil	1,000	Below	No
157	#2 Fuel Oil	1,000	Below	No
160	#2 Fuel Oil	500	Below	No
246	#2 Fuel Oil	1,000	Below	No
249	#2 Fuel Oil	1,000	Below	No
285	#2 Fuel Oil	500	Below	No
289	#2 Fuel Oil	500	Below	No
347	#2 Fuel Oil	3,000	Below	No
350	#2 Fuel Oil	2,000	Above	No
354	#2 Fuel Oil	275	Below	No
360	#2 Fuel Oil	2,500	Below	No
371	#2 Fuel Oil	275	Above	No
359	#2 Fuel Oil	4,000	Below	No
420	#2 Fuel Oil	500	Below	No
422	#2 Fuel Oil	500	Below	No
423	#2 Fuel Oil	500	Below	No
425	#2 Fuel Oil	500	Below	No
431	#2 Fuel Oil	275	Above	No
441	#2 Fuel Oil	250	Above	No
443	#2 Fuel Oil	250	Above	No
445	#2 Fuel Oil	250	Above	No
450	#2 Fuel Oil	500	Below	No
472	#2 Fuel Oil	275	Above	No
510	#2 Fuel Oil	275	Above	No
512	#2 Fuel Oil	2,500	Below	No
520	#2 Fuel Oil	275	Above	No
531	#2 Fuel Oil	300	Above	No
537	#2 Fuel Oil	2,000	Below	No
552	#2 Fuel Oil	250	Above	No
560	#2 Fuel Oil	2,000	Below	No
930	#2 Fuel Oil	550	Below	No
937	#2 Fuel Oil	2,000	Below	No
935	#2 Fuel Oil	4,000	Below	No
945	#2 Fuel Oil	2,000	Below	No
947	#2 Fuel Oil	2,000	Below	No
949	#2 Fuel Oil	2,000	Below	No
963	#2 Fuel Oil	1,000	Below	No
990	#2 Fuel Oil	10,000	Below	No
401	#2 Fuel Oil	12,000	Below	No
402	#2 Fuel Oil	12,000	Below	No
645	#2 Fuel Oil	12,000	Below	No
650	#2 Fuel Oil	12,000	Below	No
674	#2 Fuel Oil	12,000	Below	No
595	#2 Fuel Oil	550	Below	No
596	#2 Fuel Oil	1,500	Below	No

TABLE D.7
(Continued)
NO. 2 FUEL OIL STORAGE TANKS

Facility Numbers	Type of Fuel	Capacity (gal)	Above or Below Ground	Diked
610	#2 Fuel Oil	2,000	Below	No
631	#2 Fuel Oil	500	Above	No
665	#2 Fuel Oil	3,000	Below	No
686	#2 Fuel Oil	300	Below	No
701	#2 Fuel Oil	2,500	Below	No
702	#2 Fuel Oil	550	Below	No
706	#2 Fuel Oil	550	Below	No
712	#2 Fuel Oil	1,000	Below	No
714	#2 Fuel Oil	275	Below	No
717	#2 Fuel Oil	275	Below	No
719	#2 Fuel Oil	750	Below	No
721	#2 Fuel Oil	1,000	Below	No
728	#2 Fuel Oil	500	Below	No
733	#2 Fuel Oil	275	Below	No
735	#2 Fuel Oil	560	Below	No
739	#2 Fuel Oil	3,000	Below	No
741	#2 Fuel Oil	10,000	Below	No
745	#2 Fuel Oil	550	Below	No
755	#2 Fuel Oil	500	Below	No
760	#2 Fuel Oil	3,000	Below	No
765	#2 Fuel Oil	275	Below	No
767	#2 Fuel Oil	750	Below	No
770	#2 Fuel Oil	275	Below	No
772	#2 Fuel Oil	750	Below	No
775	#2 Fuel Oil	500	Below	No
783	#2 Fuel Oil	750	Below	No
785	#2 Fuel Oil	275	Below	No
799	#2 Fuel Oil	550	Below	No
902	#2 Fuel Oil	1,000	Below	No
921	#2 Fuel Oil	1,000	Below	No
923	#2 Fuel Oil	1,000	Below	No

TABLE D.8
MISCELLANEOUS STORAGE TANKS

Group	Location	Capacity (Gallons)	Diesel	Mogas	JP-4	Waste Oil
3613 CCTS	Turkey Pt.	5,000	X			
		1,000		X		
31 CES	Storage Yd.	550	X			
	181	300		X		
	181	300	X			
	2,204	313		X		
	2,204	122	X			
432 CAMS	208	1,000			X	
	208	1,000		X		
31 EMS/AGE	764	1,500			X	
	764	1,000		X		
	764	1,000			X	
301 SE/MAF	791	1,000		X		
	791	1,000	X			
	791	1,000			X	
31 CES	870	200	X			
	870	55		X		
	875	1,200	X			
	373	300	X			
	373	200		X		
	701 Pump Sta.	20		X		
	934 Pump Sta.	55		X		
	545 Pump Sta.	55		X		
	769 Pump Sta.	55		X		
	2,387 Pump Sta.	55		X		
	2,972 Pump Sta.	55		X		
	3,427 Pump Sta.	55		X		
31 CRS/MAC	4,063	2,500			X	
	268	2,500			X	
	268	1,000			X	
	268	5,000			X	
31 EMS/MUN.	294	55	X			
	294	55	X			
726 TCS	754	1,800			X	
	754	600			X	
	293	600			X	
	213	600			X	

TABLE D.8
(Continued)
MISCELLANEOUS STORAGE TANKS

Group	Location	Capacity (Gallons)	Diesel	Mogas	JP-4	Waste Oil
CUSTOMS	240	1,000	X			
KINGS BAY MARINA		2,000	X			
		2,000		X		
31 CES	Open Storage Yard, Emergency Storage	10,000	X			
	Emergency Storage	4,000	X			
	Emergency Storage	3,500	X			
	Emergency Storage	1,000	X			
	Emergency Storage	300	X			
31 CRS	709	1,000	(PD-680)			
DPDO		500				X
		500				X
31 CES-DEF	Fire Trng. Pit.	5,000				X
31 CRS	750	1,000				X
31 EMS/AGE	763	100				X
726 TCS	211	500				X
LGT	312	500				X
31 CES	176	500				X

APPENDIX E

MASTER LIST OF SHOPS

APPENDIX E

MASTER LIST OF SHOPS

Name	Present Location (Bldg. No.)	Handles Hazardous (CERCLA) Materials	Generates Hazardous (CERCLA) Wastes	Typical TSD Methods
31st Aircraft Generation Squadron				
Gold Flight (306 TFS)	730	Yes	Yes	DPDO
Red Flight (307 TFS)	717	Yes	Yes	DPDO
Green Flight (308 TFS)	733	Yes	Yes	DPDO
Blue Flight (309 TFS)	714	Yes	Yes	DPDO
Weapons Loading & Training	779	Yes	Yes	Gen. Refuse
31st Component Repair Squadron				
Avionics Age	760	Yes	Yes	Gen. Refuse
Comm/Nav Shop	760	Yes	No	--
ECM Shop	739	Yes	Yes	Gen. Refuse
Instrument/Auto Pilot Shop	760	Yes	No	--
WCS Weapons Control System Calibration Dock	761,762	No	No	--
Electrical Systems/Battery Shop/Nicad	745	Yes	Yes	Neutralized, to Sanitary Sewer
Engine Shop	750	Yes	Yes	Separator/ Sanitary Sewer DPDO
Environmental Systems/LOX Storage	745	No	No	--
Flight & Nav Simulator	775	No	No	--

Name	Present Location Bldg. No.)	Handles Hazardous (CERCLA) Materials	Generates Hazardous (CERCLA) Wastes	Typical TSD Methods
31st Component Repair Squadron (Continued)				
Jet Engine Test Stands	253,254,268	Yes	Yes	Separator/ Sewer
Machine Shop	745	Yes	Yes	DPDO
Metal Processing (Welding)	745	Yes	No	--
NDI Lab	755	Yes	No	--
PMEL	784	Yes	Yes	DPDO
Pneudraulic Shop	745	Yes	Yes	DPDO
Structural Repair (Sheet Metal)	745	Yes	No	--
Survival Equipment	560,561	Yes	No	--
Trim Pad/Sound Supressors	4064-4067	Yes	Yes	Fire Training
WCS Radar Shop	760	Yes	No	--
31st Equipment Maintenance Squadron				
Age Shop/Pickup-Delivery Inspection & Repair	763,764,766	Yes	Yes	DPDO
Armament	740	Yes	Yes	DPDO
Corrosion Control	720,723,727,729	Yes	Yes	DPDO
Egress Shop	741	Yes	Yes	DPDO
Explosive Ordnance Disposal (EOD)	797	Yes	Yes	To Avon Park
Fuel System Repair	708	Yes	No	--
Missile Maintenance Shop	251	Yes	Yes	DPDO
Munitions Delivery	246	Yes	No	--

Name	Present Location (Bldg. No.)	Handles Hazardous (CERCLA) Materials	Generates Hazardous (CERCLA) Wastes	Typical TSD Methods
31st Equipment Maintenance Squadron (continued)				
Munitions Equipment Maintenance	284	Yes	Yes	DPDO
Munitions Inspection Shop	252	Yes	No	--
Munitions Maintenance Shop	252	Yes	Yes	To Avon Park
Munitions Maintenance Storage	249	Yes	No	--
Phase Inspection (Maintenance)	741	Yes	Yes	Fuel Reuse/DPDO
Repair/Reclamation Shop	741	Yes	No	--
Transient Alert (Maintenance)	707	Yes	No	--
Wheel & Tire Shop	750	Yes	Yes	DPDO
31st Tactical Training Wing, Deputy Commander for Operations				
Base Life Support	184	No	No	--
306 TFS Life Support, Gold	767	No	No	--
307 TFS Life Support, Red	712	No	No	--
308 TFS Life Support, Green	728	No	No	--
309 TFS Life Support, Blue	712	No	No	--
Photo Lab	799	Yes	Yes	Sanitary Sewer/ Silver Recovery to DPDO
31st Supply Squadron				
Bulk Fuels Storage	311,314,330,331,332	Yes	No	--

Name	Present Location (Bldg. No.)	Handles Hazardous (CERCLA) Materials	Generates Hazardous (CERCLA) Wastes	Typical TSD Methods
31st Supply Squadron (continued)				
Fuel Lab	716	Yes	Yes	Fuel Reuse/ Sanitary Sewer
LOX Plant	616	Yes	No	--
POL	716	Yes	No	--
Supply Warehouse Adm/Radioactive Material Storage	618	Yes	No	--
31st Transportation Squardon				
Allied Trades	312	Yes	Yes	DPDO
Air Freight/Surface Freight	624	No	No	--
Fire/Crash Vehicle Maintenance	706	Yes	No	--
Locomotive Maintenance	312	Yes	No	--
Packing & Crating	624	No	No	--
Refueling Maintenance	711	Yes	Yes	DPDO
Tire & Battery Shop	312	Yes	Yes	Neutralized to Sanitary Sewer/DPDO
Vehicle Maintenance	312	Yes	Yes	DPDO/Neutral-ized to Sani-tary Sewer
Vehicle Operations	312	No	No	--
USAF Hospital, Homestead				
Base Dental Clinic	686	Yes	Yes	Sanitary Sewer

Name	Present Location (Bldg. No.)	Handles Hazardous (CERCLA) Materials	Generates Hazardous (CERCLA) Wastes	Typical TSD Methods
USAF Hospital, Homestead (continued)				
Dental/Oral Surgery	990	Yes	Yes	Sanitary Sewer
Medical Laboratory	990	Yes	Yes	Autoclave/ Refuse
Medical Maintenance	990	No	No	--
Medical X-Ray	990	Yes	Yes	Sanitary Sewer/ Silver Recovery to DPDO
OB/GYN Clinic	990	Yes	No	--
Pharmacy	990	Yes	No	--
Surgery/Anethesiology	990	Yes	No	--
Urology, Morgue, ICU, BES, Central Supply, Physical Therapy	990	Yes	No	--
Vet Services	637	Yes	No	--
31st Command Support Group				
Audio Visual Center/Base Photo Lab	101	Yes	Yes	Sanitary Sewer Silver Recovery to DPDO
Graphics Shop	101	No	No	--
Reproduction	571	No	No	--
Small Arms Training	116	Yes	Yes	Separator/ Sanitary Sewer
Morale, Welfare and Recreation				
Auto Hobby Shop	204	Yes	Yes	Contractor

Name	Present Location (Bldg. No.)	Handles Hazardous (CERCLA) Materials	Generates Hazardous (CERCLA) Wastes	Typical TSD Methods
Morale, Welfare and Recreation (continued)				
Wood Hobby Shop	122	No	No	--
31st Civil Engineering Squadron				
Carpenter Shop	176	No	No	--
Entomology	371	Yes	Yes	DPDO
Exterior Electric	164	Yes	Yes	DPDO
Fire Department	706	Yes	Yes	DPDO
Fire Ext. Maintenance	550	Yes	Yes	Sanitary Sewer
Golf Course Maintenance	2204	Yes	Yes	DPDO
Grounds Shop	181	Yes	Yes	DPDO
Heating Shop	121	Yes	Yes	Fire Training
Heavy Equipment Maintenance	180	Yes	Yes	DPDO
Interior Electric Shop	164	No	No	--
Liquid Fuel Maintenance	121	Yes	Yes	DPDO
Mason Shop	176	No	No	--
Paint Shop	174	Yes	Yes	Gen. Refuse
Pavement Shop	180	No	No	--
Plumbing Shop	176	Yes	Yes	Sanitary Sewer
Power Production	176	Yes	Yes	DPDO/Neutral to Sanitary Sewer
Refrigeration & A/C Shop	176	Yes	Yes	DPDO
Sewage Plant (inactive)	870	Yes	No	--

Name	Present Location (Bldg. No.)	Handles Hazardous (CERCLA) Materials	Generates Hazardous (CERCLA) Wastes	Typical TSD Methods
31st Civil Engineering Squadron				
Structural Repair	164	Yes	No	--
Water Plant	373	Yes	No	--
Defense Property Disposal Office				
Receiving	607,608	Yes	Yes	Contractor
Det 1, 40 ARRS				
Helicopter Maintenance	791,796	Yes	Yes	DPDO
301st Air Rescue and Recovery Squadron (ARRS)				
Avionics Age	739	Yes	Yes	DPDO
Communication Shop	739	No	No	--
Corrosion Control Shop	792	Yes	Yes	DPDO
Electric Shop	739	No	No	--
Engine/Propeller Shop	792	Yes	Yes	DPDO
Flightline Maintenance (C-130 ACFT)	790	Yes	Yes	Fuel Reuse/ DPDO
Flightline Maintenance (HH3-E Helicopter)	776	Yes	Yes	DPDO
Instrument/Auto Pilot Shop	739	No	No	--
ISO Docks (Phase Inspections)	793	Yes	Yes	DPDO
Pararescue	758	No	No	--
Pneudraulics	792	Yes	Yes	DPDO

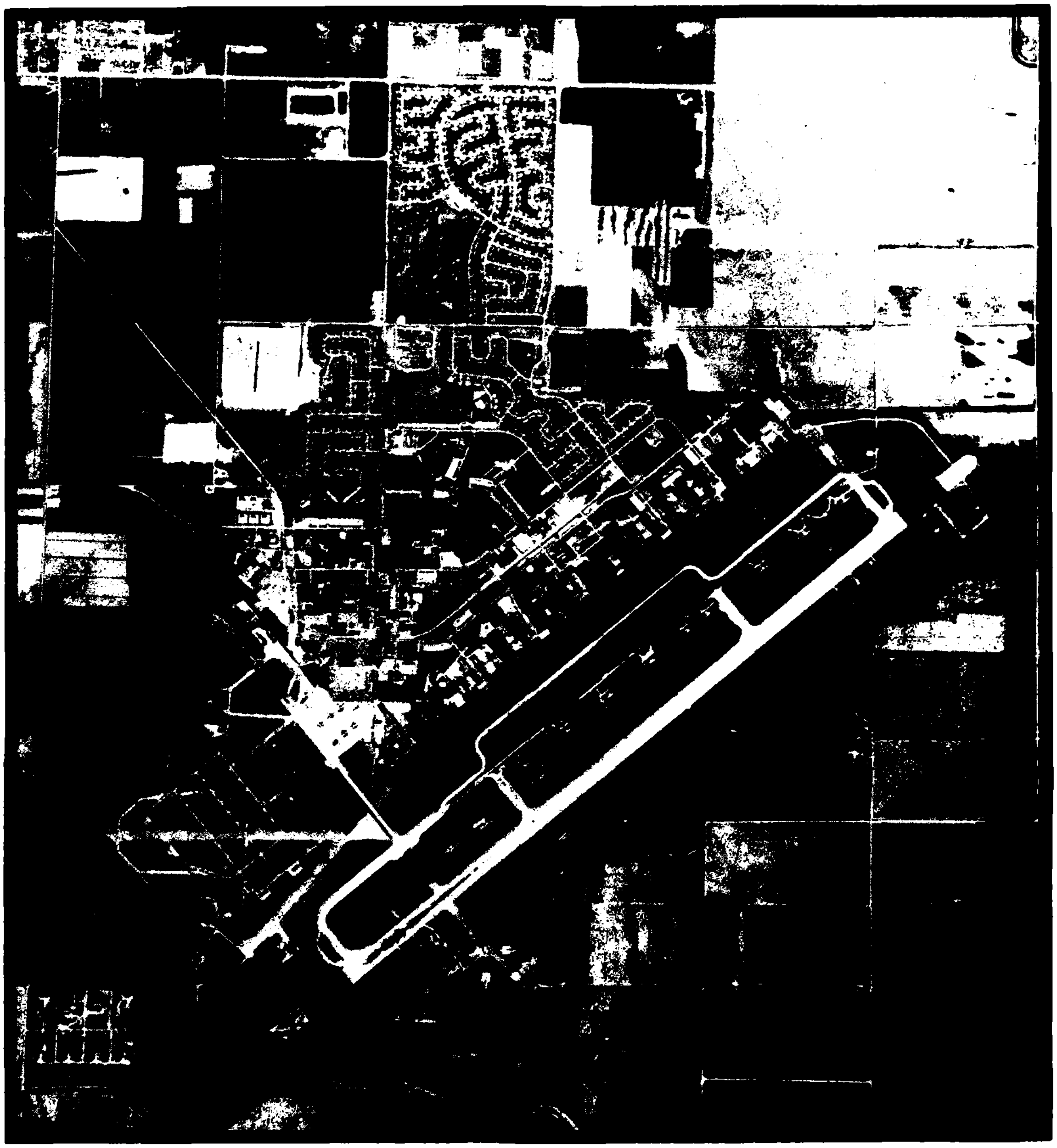
Name	Present Location (Bldg. No.)	Handles Hazardous (CERCLA) Materials	Generates Hazardous (CERCLA) Wastes	Typical TSD Methods
301st Air Rescue and Recovery Squadron (ARRS) (continued)				
Support Equipment	791	No	No	--
Weapons Shop	792	Yes	No	--
726th Tactical Control Squadron				
Age	213	Yes	Yes	DPDO
Comm Maint (Ground Radio, Radio Relay, Secure Comm)	213,239	No	No	--
Computer Maintenance	213	No	No	--
Fabric Shop	213	Yes	Yes	Gen. Refuse
Paint & Body Shop	213	Yes	No	--
Radar Maintenance Shop	213	No	No	--
Vehicle Maintenance	211	Yes	Yes	DPDO
482nd Consolidated Aircraft Maintenance Squadron				
Aircraft Generation Branch	200	Yes	No	--
Component Repair Branch				
Avionics Age	585	Yes	No	--
ECM	585	No	No	--
Electric Shop	194	Yes	Yes	DPDO
Engine Shop	150	Yes	Yes	DPDO
Environmental Systems/ Hydraulic Shop	194	Yes	Yes	DPDO
Inertial Navigation	585	No	No	--

Name	Present Location Bldg. No.)	Handles Hazardous (CERCLA) Materials	Generates Hazardous (CERCLA) Wastes	Typical TSD Methods
482nd Consolidated Aircraft Maintenance Squadron (continued)				
Instruments/Auto Pilot Shop	585	No	No	--
Machine Shop	194	Yes	Yes	DPDO
Metal Processing (Welding Shop)	197	Yes	No	--
NDI Lab	755	Yes	Yes	DPDO/Sanitary Sewer
Radio	585	No	No	--
Structural Repair (Sheet Metal)	194	No	No	--
WCS	585	No	No	--
Equipment Maintenance Branch				
Age Shop	208	Yes	Yes	DPDO
Corrosion Control	173	Yes	Yes	DPDO/Sanitary Sewer
Egress	179	Yes	No	--
Fuel Shop	173	Yes	Yes	Contractor
ISO Docks (Phase Inspection)	200	Yes	Yes	Speedi-Dry/ Gen. Refuse
Repair/Reclamation/Wheel & Tire Shop	200	Yes	Yes	DPDO
Maintenance Branch				
Gun & Release Shop	192	Yes	Yes	DPDO
Munitions Maintenance	192	Yes	No	--
1942nd Communications Squadron				
A/C Radar Maintenance	739	No	No	--

Name	Present Location Bldg. No.)	Handles Hazardous (CERCLA) Materials	Generates Hazardous (CERCLA) Wastes	Typical TSD Methods
1942nd Communications Squadron (continued)				
CCTV/Radio Maintenance	739	No	No	--
Comm. Maintenance, Ground Radio, Radio Relay	213	No	No	--
Navigational Aids	739	No	No	--

APPENDIX F

PHOTOGRAPHS



Homestead AFB, Florida

November 25, 1969

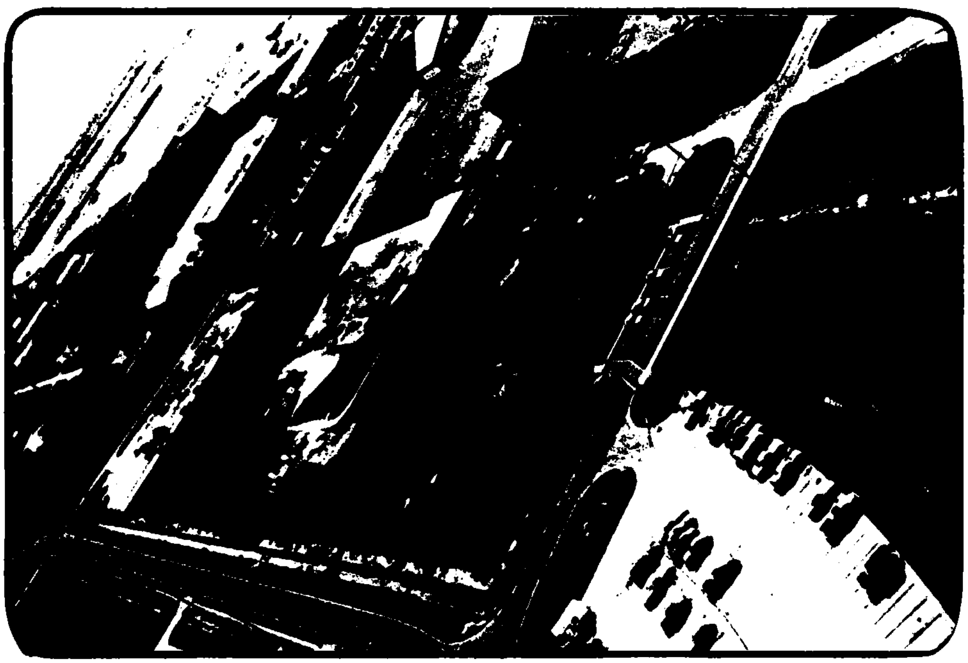
-N-

ENGINEERING-SCIENCE

HOMESTEAD AFB

PCB Spill Site

Entomology Storage

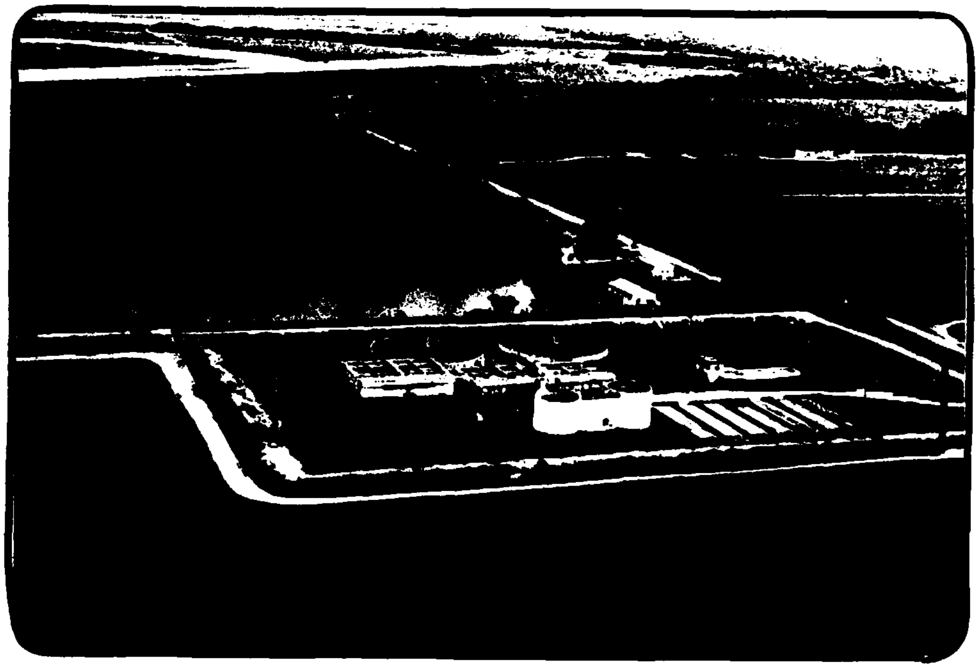


Aircraft Washrack

ES ENGINEERING-SCIENCE

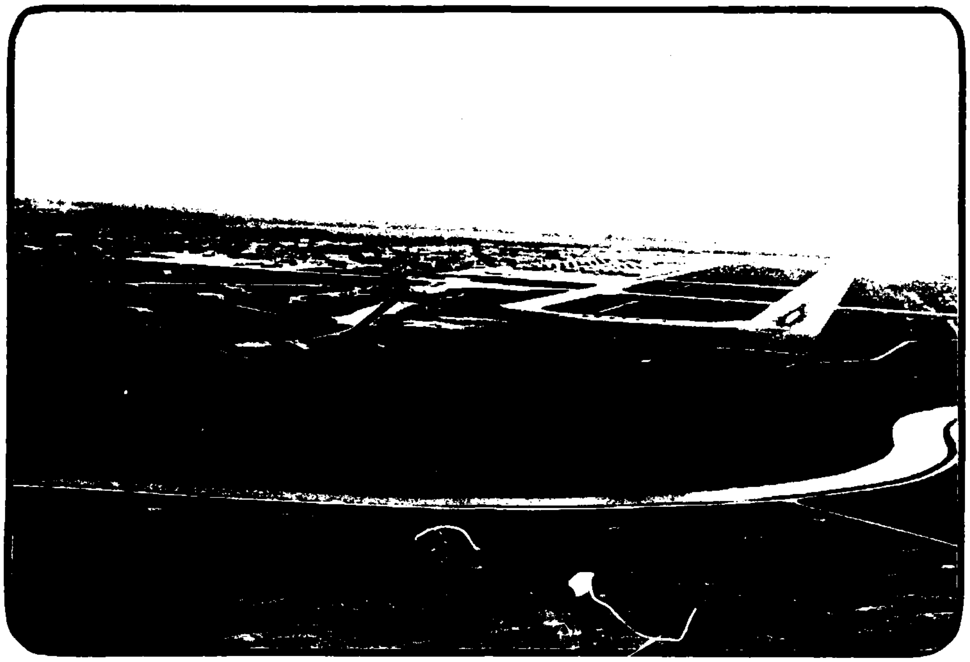
HOMESTEAD AFB

Landfill

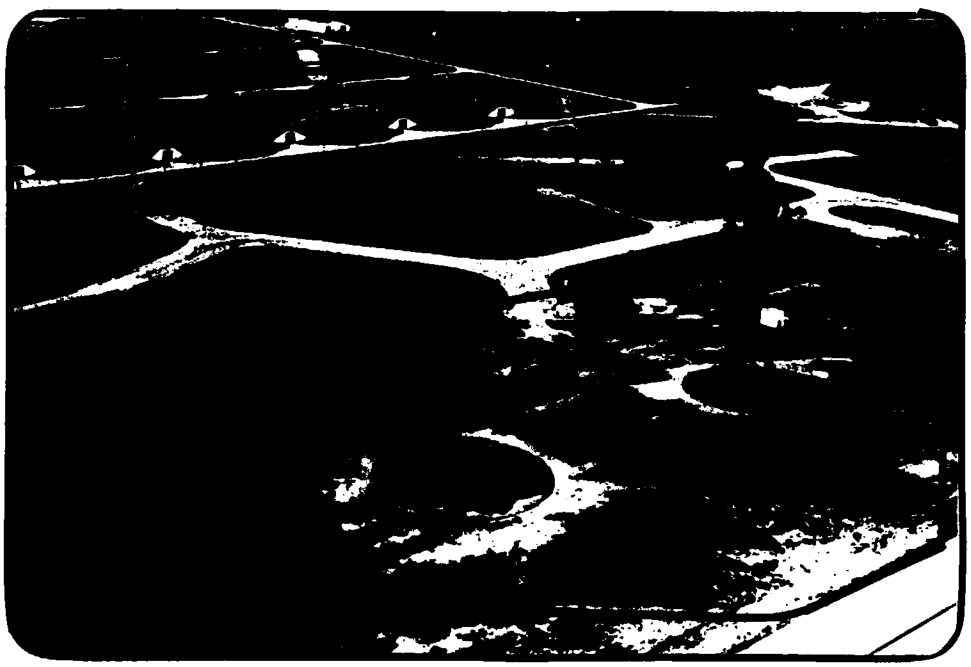


Sewage Treatment Plant

HOMESTEAD AFB

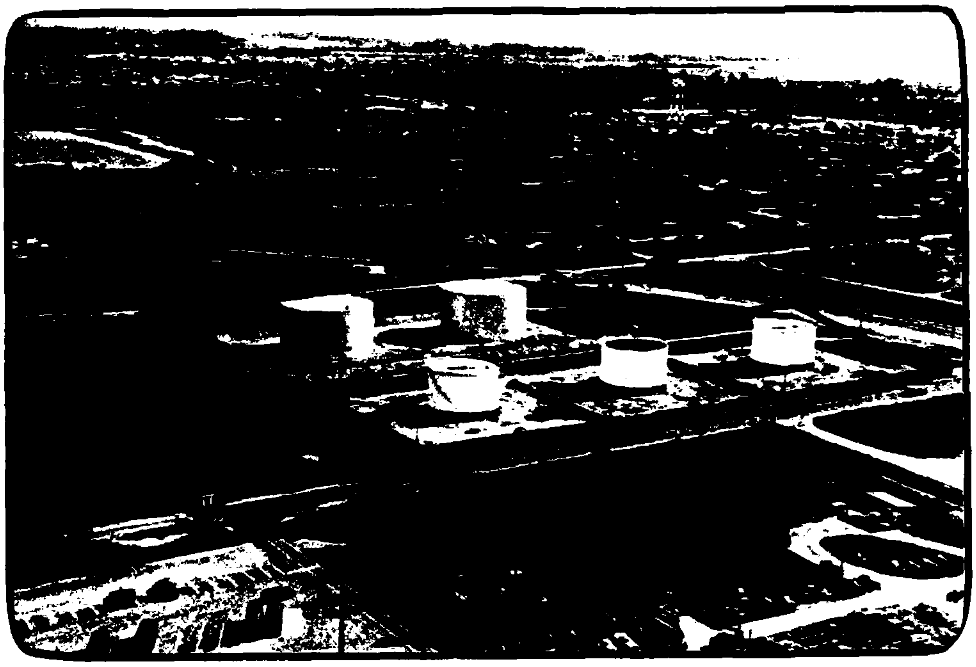


Fire Training Area No. 2

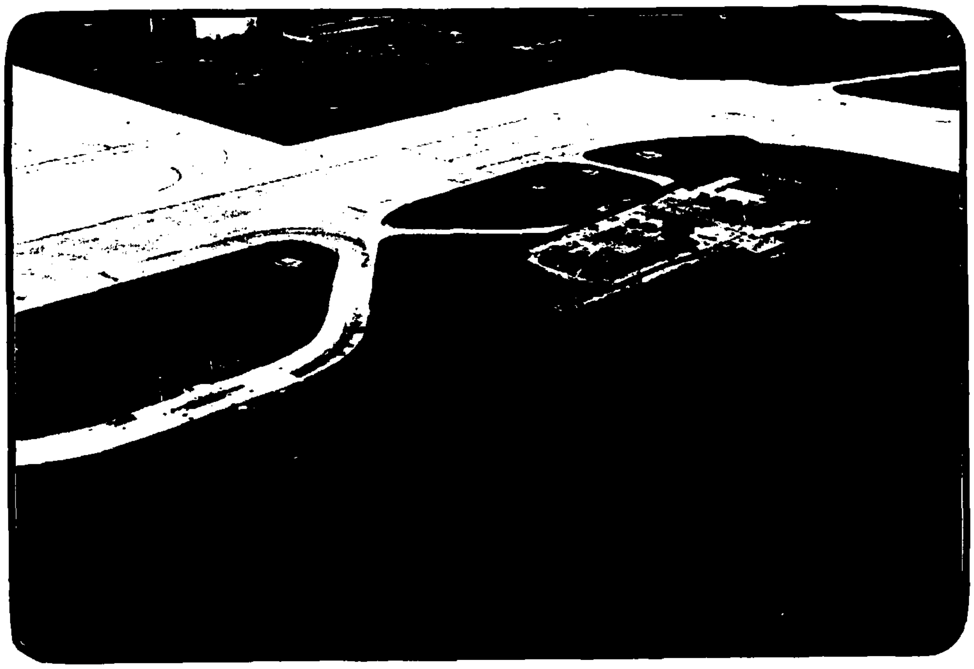


Fire Training Area No. 3

HOMESTEAD AFB



POL Storage Area



Pump House No. 9

APPENDIX G

HAZARD ASSESSMENT RATING METHODOLOGY

APPENDIX G

USAF INSTALLATION RESTORATION PROGRAM
HAZARD ASSESSMENT RATING METHODOLOGY

BACKGROUND

The Department of Defense (DOD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DOD facilities. One of the actions required under this program is to:

> "develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts." (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Records Search phase of its Installation Restoration Program (IRP).

The first site rating model was developed in June 1981 at a meeting with representatives from USAF Occupational Environmental Health Laboratory (OEHL), Air Force Engineering Services Center (AFESC), Engineering-Science (ES) and CH_2M Hill. The basis for this model was a system developed for EPA by JRB Associates of McLean, Virginia. The JRB model was modified to meet Air Force needs.

After using this model for 6 months at over 20 Air Force installations, certain inadequacies became apparent. Therefore, on January 26 and 27, 1982, representatives of USAF OEHL, AFESC, various major commands, Engineering Science, and CH_2M Hill met to address the inadequacies. The result of the meeting was a new site rating model designed to present a better picture of the hazards posed by sites at Air Force installations. The new rating model described in this presentation is referred to as the Hazard Assessment Rating Methodology.

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air Force in setting priorities for follow-on site investigations and confirmation work under Phase II of IRP.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DOD program needs.

The model uses data readily obtained during the Record Search portion (Phase I) of the IRP. Scoring judgments and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards at the site. This approach meshes well with the policy for evaluating and setting restrictions on excess DOD properties.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: the possible receptors of the contamination, the waste and its characteristics, potential pathways for waste contaminant migration, and any efforts to contain the contaminants. Each of these categories contains a number of rating factors that are used in the overall hazard rating.

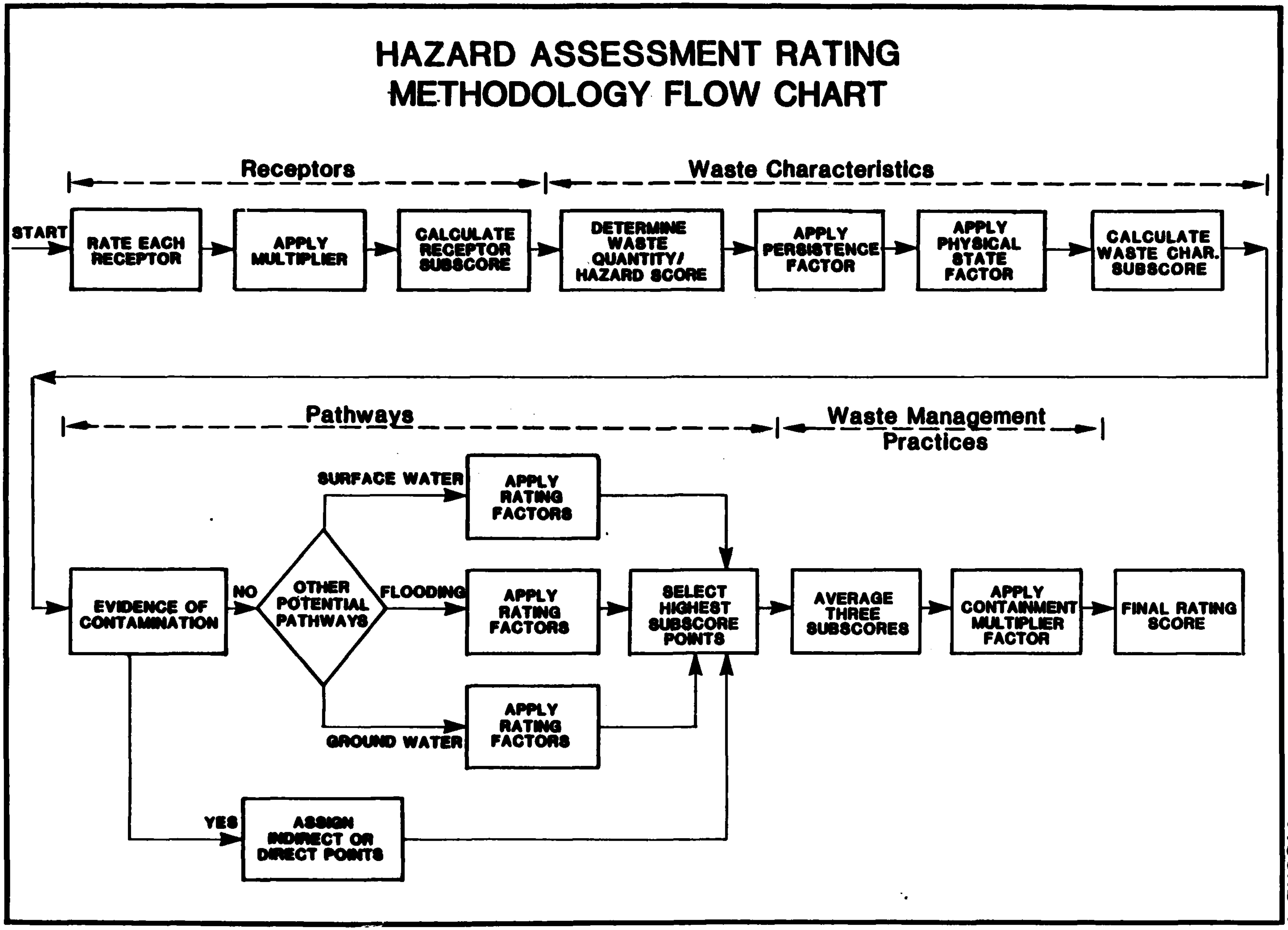
The receptors category rating is calculated by scoring each factor, multiplying by a factor weighting constant and adding the weighted scores to obtain a total category score.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned and for direct evidence 100 points are assigned. If no evidence is found, the highest score among three possible routes is used. These routes are surface water migration, flooding, and ground-water migration. Evaluation of each route involves factors associated with the particular migration route. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The scores for each of the three categories are then added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Sites at which there is no containment are not reduced in score. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factor to the sum of the scores for the other three categories.

FIGURE 1



HAZARD ASSESSMENT RATING
METHODOLOGY FLOW CHART
Receptors
Waste Characteristics
START
RATE EACH RECEPTOR
APPLY MULTIPLIER
CALCULATE RECEPTOR SUBSCORE
DETERMINE WASTE QUANTITY/ HAZARD SCORE
APPLY PERSISTENCE FACTOR
APPLY PHYSICAL STATE FACTOR
CALCULATE WASTE CHAR. SUBSCORE
Pathways
Waste Management Practices
EVIDENCE OF CONTAMINATION
NO
OTHER POTENTIAL PATHWAYS
SURFACE WATER
FLOODING
GROUND WATER
APPLY RATING FACTORS
APPLY RATING FACTORS
APPLY RATING FACTORS
SELECT HIGHEST SUBSCORE POINTS
AVERAGE THREE SUBSCORES
APPLY CONTAINMENT MULTIPLIER FACTOR
FINAL RATING SCORE
YES
ASSIGN INDIRECT OR DIRECT POINTS

FIGURE 2

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE ______________________________

LOCATION ______________________________

DATE OF OPERATION OR OCCURRENCE ______________________________

OWNER/OPERATOR ______________________________

COMMENTS/DESCRIPTION ______________________________

SITE RATED BY ______________________________

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to reservation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Ground water use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by ground-water supply within 3 miles of site		6		
		Subtotals	______	______

Receptors subscore (100 X factor score subtotal/maximum score subtotal) ______

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) ______
2. Confidence level (C = confirmed, S = suspected) ______
3. Hazard rating (H = high, M = medium, L = low) ______

Factor Subscore A (from 20 to 100 based on factor score matrix) ______

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

______ X ______ = ______

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

______ X ______ = ______

FIGURE 2 (Continued)

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore ______

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		
		Subtotals	______	______

Subscore (100 X factor score subtotal/maximum score subtotal) ______

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding		1		

Subscore (100 x factor score/3) ______

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to ground water		8		
		Subtotals	______	______

Subscore (100 x factor score subtotal/maximum score subtotal) ______

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore ______

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors ______
Waste Characteristics ______
Pathways ______

Total ______ divided by 3 = ______
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

______ X ______ = [ ]

TABLE 1

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
A. Population within 1,000 feet (includes on-base facilities)	0	1 - 25	26 - 100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Land Use/Zoning (within 1 mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or industrial	Residential	3
D. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	6
E. Critical environments (within 1 mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination.	Major habitat of an endangered or threatened species; presence of recharge area; major wetlands.	10
F. Water quality/use designation of nearest surface water body	Agricultural or industrial use.	Recreation, propagation and management of fish and wildlife.	Shellfish propagation and harvesting.	Potable water supplies	6
G. Ground-Water use of uppermost aquifer	Not used, other sources readily available.	Commercial, industrial, or irrigation, very limited other water sources.	Drinking water, municipal water available.	Drinking water, no municipal water available; commercial, industrial, or irrigation, no other water source available.	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1 - 50	51 - 1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1 - 50	51 - 1,000	Greater than 1, 000	6

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (<5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (>20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records.
- o Knowledge of types and quantities of wastes generated by shops and other areas on base.
- o Based on the above, a determination of the types and quantities of waste disposed of at the site.

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records.
- o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site.

A-3 Hazard Rating

Hazard Category	Rating Scale Levels 0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

II. WASTE CHARACTERISTICS (Continued)

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
80	L	C	M
	M	C	H
70	L	S	H
60	S	C	H
	M	C	M
50	L	S	M
	L	C	L
	M	S	H
	S	C	M
40	S	S	H
	M	S	M
	M	C	L
	L	S	L
30	S	C	L
	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:
Confidence Level
- o Confirmed confidence levels (C) can be added
- o Suspected confidence levels (S) can be added
- o Confirmed confidence levels cannot be added with suspected confidence levels

Waste Hazard Rating
- o Wastes with the same hazard rating can be added
- o Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 POTENTIAL FOR SURFACE WATER CONTAMINATION

Rating Factor	Rating Scale Levels 0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 in.	-10 to + 5 in.	+5 to +20 in.	Greater than +20 in.	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($<10^{-6}$ cm/sec)	6
Rainfall intensity based on 1 year 24-hr rainfall	<1.0 inch	1.0-2.0 inches	2.1-3.0 inches	>3.0 inches	8

B-2 POTENTIAL FOR FLOODING

Rating Factor	0	1	2	3	Multiplier
Floodplain	Beyond 100-year floodplain	In 25-year floodplain	In 10-year floodplain	Floods annually	1

B-3 POTENTIAL FOR GROUND-WATER CONTAMINATION

Rating Factor	0	1	2	3	Multiplier
Depth to ground water	Greater than 500 ft	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 in.	-10 to +5 in.	+5 to +20 in.	Greater than +20 in.	6
Soil permeability	Greater than 50% clay ($>10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	0% to 15% clay ($<10^{-2}$ cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well casings, subsidence fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. **WASTE MANAGEMENT PRACTICES FACTOR**

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

<u>Landfills:</u>

- Clay cap or other impermeable cover
- Leachate collection system
- Liners in good condition
- Adequate monitoring wells

<u>Surface Impoundments:</u>

- Liners in good condition
- Sound dikes and adequate freeboard
- Adequate monitoring wells

<u>Spills:</u>

- Quick spill cleanup action taken
- Contaminated soil removed
- Soil and/or water samples confirm total cleanup of the spill

<u>Fire Proection Training Areas:</u>

- Concrete surface and berms
- Oil/water separator for pretreatment of runoff
- Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1 or III-B-3, then leave blank for calculation of factor score and maximum possible score.

APPENDIX H

HAZARD ASSESSMENT RATING METHODOLOGY FORMS

HAZARD ASSESSMENT RATING METHODOLOGY FORMS

TABLE OF CONTENTS

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE ELECTROPLATING WASTE DISPOSAL SITE

LOCATION IMMEDIATELY EAST OF BUILDING 164

DATE OF OPERATION OR OCCURRENCE 1946-1953 (Exact period unknown)

OWNER/OPERATOR NON-MILITARY OPERATION DURING PERIOD WHEN BASE WAS INACTIVE

COMMENTS/DESCRIPTION SURFACE DISPOSAL OF SPENT PLATING BATHS & RINSES

SITE RATED BY E. J. Schroeder R. L. Rogers

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	0	9	0	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
Subtotals			97	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 54

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B
80 x 1.0 = 80

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore
80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
		Subtotals	60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
		Subtotals	92	114

Subscore (100 x factor score subtotal/maximum score subtotal) 81

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 81

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54
Waste Characteristics	80
Pathways	81
Total 215 divided by 3 =	72
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

72 x 1.0 = $\boxed{72}$

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE LEAK AT POL BULK STORAGE TANK FARM

LOCATION NORTHWEST CORNER OF BASE NEAR WEST GATE

DATE OF OPERATION OR OCCURRENCE CIRCA 1958

OWNER/OPERATOR HOMESTEAD AFB

COMMENTS/DESCRIPTION UNDERGROUND PIPELINE LEAK OF JP-4 JET FUEL

SITE RATED BY E J Schroeder RJ Brown

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
Subtotals			130	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 72

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
Subtotals			60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	3	8	24	24
Subtotals			100	114

Subscore (100 x factor score subtotal/maximum score subtotal) 88

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 88

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	72
Waste Characteristics	48
Pathways	88

Total 208 divided by 3 = 69 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

69 x 1.0 = 69

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE OIL SPILLS AT AIRCRAFT WASH RACK

LOCATION APRON 4047 NEAR BUILDING 724

DATE OF OPERATION OR OCCURRENCE APPROXIMATELY 1970-1982, CONTINUOUS

OWNER/OPERATOR HOMESTEAD AFB

COMMENTS/DESCRIPTION WASTE OILS SPILLED OR OVERFLOWED FROM STORAGE TANKS

SITE RATED BY E J Schroeder R J Lemm

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	0	9	0	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	97	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 54

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

80 x 0.9 = 72

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

72 x 1.0 = 72

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
Subtotals			60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
Subtotals			92	114

Subscore (100 x factor score subtotal/maximum score subtotal) 81

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 81

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54
Waste Characteristics	72
Pathways	81

Total 207 divided by 3 = 69 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

69 x 1.0 = 69

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE FIRE PROTECTION TRAINING AREA NO. 3

LOCATION IMMEDIATELY NORTHEAST OF ORDNANCE STORAGE AREA

DATE OF OPERATION OR OCCURRENCE 1972 - PRESENT

OWNER/OPERATOR HOMESTEAD AFB

COMMENTS/DESCRIPTION BURNED JP-4, CONTAMINATED FUELS, AND WASTES FROM SHOPS

SITE RATED BY E / Schroeder D J Reuss

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	0	9	0	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	95	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 53

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
Subtotals			60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
Subtotals			92	114

Subscore (100 x factor score subtotal/maximum score subtotal) 81

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 81

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	53
Waste Characteristics	64
Pathways	81

Total 198 divided by 3 = 66 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Wast Management Practices Factor = Final Score

66 x 1.0 = 66

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE FIRE PROTECTION TRAINING AREA NO. 2

LOCATION SOUTH OF ORDNANCE STORAGE AREA JUST NORTH OF APPROACH TO RUNWAY 05

DATE OF OPERATION OR OCCURRENCE 1955 to 1972

OWNER/OPERATOR HOMESTEAD AFB

COMMENTS/DESCRIPTION BURNED JP-4, CONTAMINATED FUELS AND WASTES FROM SHOPS

SITE RATED BY E J Schroeder R J Brown

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	0	9	0	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	95	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 53

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
Subtotals			60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
Subtotals			92	114

Subscore (100 x factor score subtotal/maximum score subtotal) 81

C. Highest pathway subscore.

Enter the highest subscore value from A. B-1, B-2 or B-3 above.

Pathways Subscore 81

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	53
Waste Characteristics	64
Pathways	81

Total 198 divided by 3 = 66 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Manageme' ·ractices Factor = Final Score

66 x 1.0 = 66

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE MOGAS LEAK AT BX SERVICE STATION

LOCATION BX SERVICE STATION (BLDG. 343) EAST OF POL TANK FARM

DATE OF OPERATION OR OCCURRENCE 1980

OWNER/OPERATOR HOMESTEAD AFB

COMMENTS/DESCRIPTION SUSPECTED LEAK FROM UNDERGROUND MOGAS TANK

SITE RATED BY E/ Schraeder RJ Bunn

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	130	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 72

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

50 x 0.8 = 40

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
Subtotals			60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
Subtotals			92	114

Subscore (100 x factor score subtotal/maximum score subtotal) 81

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 81

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	72
Waste Characteristics	40
Pathways	81

Total 193 divided by 3 = 64 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

64 x 1.0 = $\boxed{64}$

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE ENTOMOLOGY STORAGE AREA

LOCATION C.E. STORAGE COMPOUND

DATE OF OPERATION OR OCCURRENCE 1960's - PRESENT

OWNER/OPERATOR HOMESTEAD AFB

COMMENTS/DESCRIPTION DRUMS STORED UNDER SHELTER IN FENCED-IN AREA

SITE RATED BY E. J. Schroeder R. J. Brown

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	126	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 70

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

60 x 0.9 = 54

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

54 x 1.0 = 54

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
		Subtotals	60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	3	8	24	24
		Subtotals	84	114

Subscore (100 x factor score subtotal/maximum score subtotal) 74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 74

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	70
Waste Characteristics	54
Pathways	74

Total 198 divided by 3 = 66 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

66 x 0.95 = $\boxed{63}$

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE OIL LEAKAGE BEHIND MOTOR POOL

LOCATION WEST EDGE OF BASE, SOUTHEAST OF BLDG. 312

DATE OF OPERATION OR OCCURRENCE DURING LAST SEVERAL YEARS

OWNER/OPERATOR HOMESTEAD AFB

COMMENTS/DESCRIPTION LEAKAGE FROM TANKS BEHIND SHOP

SITE RATED BY E. T. Schroeder R. J. [illegible]

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
Subtotals			130	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 72

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) L

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

30 x 0.8 = 24

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

24 x 1.0 = 24

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
		Subtotals	60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
		Subtotals	92	114

Subscore (100 x factor score subtotal/maximum score subtotal) 81

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 81

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	72
Waste Characteristics	24
Pathways	81
Total 177 divided by 3 =	59 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

59 x 1.0 = 59

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE FIRE PROTECTION TRAINING AREA NO. 1

LOCATION NORTHWEST OF RUNWAY NEAR TAXIWAY B

DATE OF OPERATION OR OCCURRENCE APPROXIMATELY 1943-1945

OWNER/OPERATOR HOMESTEAD AFB

COMMENTS/DESCRIPTION SURFACE SOILS MOVED WHEN RUNWAY WAS RELOCATED

SITE RATED BY E J Schroeder Lf Rym

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	0	9	0	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	85	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 47

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
		Subtotals	60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
		Subtotals	92	114

Subscore (100 x factor score subtotal/maximum score subtotal) 81

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 81

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	47
Waste Characteristics	48
Pathways	81
Total 176 divided by 3 =	59 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

59 x 1.0 = 59

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE LEAK AT PUMP STATION NO. 9 ON FLIGHT APRON

LOCATION EXTREME NORTHEAST END OF INSTRUMENT RUNWAY APRON

DATE OF OPERATION OR OCCURRENCE MAY 1982

OWNER/OPERATOR HOMESTEAD AFB

COMMENTS/DESCRIPTION UNDERGROUND PIPELINE LEAK OF JP-4 JET FUEL

SITE RATED BY E. J. Schroeder R. J. Remm

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	0	9	0	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	85	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 47

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
Subtotals			60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	3	8	24	24
Subtotals			100	114

Subscore (100 x factor score subtotal/maximum score subtotal) 88

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 88

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	47
Waste Characteristics	48
Pathways	88
Total 183 divided by 3 =	61 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

61 x .95 = 58

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE RESIDUAL PESTICIDE DISPOSAL AREA

LOCATION BETWEEN ORDNANCE STORAGE AND U.S. CUSTOMS AREA

DATE OF OPERATION OR OCCURRENCE 1977 - 1982

OWNER/OPERATOR HOMESTEAD AFB

COMMENTS/DESCRIPTION PESTICIDE RESIDUES SPREAD OVER GROUND WITH CHLORINE BLEACH & AMMONIA

SITE RATED BY E J Schroeder R L Brown

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	122	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 68

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

60 x 0.4 = 24

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

24 x 1.0 = 24

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
Subtotals			60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
Subtotals			92	114

Subscore (100 x factor score subtotal/maximum score subtotal) 81

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 81

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	68
Waste Characteristics	24
Pathways	81
Total 173 divided by 3 =	58 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

58 x 1.0 = $\boxed{58}$

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE LANDFILL

LOCATION SOUTHEAST OF RUNWAY OPPOSITE TAXIWAY C

DATE OF OPERATION OR OCCURRENCE APPROXIMATELY 1940 to 1950

OWNER/OPERATOR PAN AMERICAN AIR FERRIES, HOMESTEAD AFB, DADE COUNTY

COMMENTS/DESCRIPTION ORIGINALLY AN OPEN DUMP, LATER CONVERTED TO LANDFILL

SITE RATED BY E. J. Schroeder R. J. Reimer

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	0	9	0	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	81	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 45

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

80 x 0.4 = 32

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

32 x 0.5 = 16

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
		Subtotals	68	108

Subscore (100 X factor score subtotal/maximum score subtotal) 63

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	3	8	24	24
		Subtotals	100	114

Subscore (100 x factor score subtotal/maximum score subtotal) 88

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 88

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	45
Waste Characteristics	16
Pathways	88

Total 149 divided by 3 = 50 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

50 x 1.0 = 50

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE PCB SPILL IN CIVIL ENGR. STORAGE COMPOUND

LOCATION WEST SIDE OF BASE NEAR BLDG. 203

DATE OF OPERATION OR OCCURRENCE 1980

OWNER/OPERATOR HOMESTEAD AFB

COMMENTS/DESCRIPTION PCB CONTAMINATED (>50 to <500ppm) TRANSFORMER KNOCKED OVER-SPILLED FLU

SITE RATED BY [signatures]

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	130	180

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 72

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

60 x 1.0 = 60

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

60 x 1.0 = 60

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	NA	8	NA	NA
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
		Subtotals	60	84

Subscore (100 X factor score subtotal/maximum score subtotal) 71

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding	NA	1	NA	NA

Subscore (100 x factor score/3) NA

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	3	8	24	24
		Subtotals	92	114

Subscore (100 x factor score subtotal/maximum score subtotal) 81

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 81

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	72
Waste Characteristics	60
Pathways	81

Total 213 divided by 3 = 71 Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

71 x 0.1 = $\boxed{7}$

APPENDIX I.

REFERENCES

APPENDIX I
REFERENCES

1. Allman, D. W.; Jakob, P. G.; McCann, T., 1979. Improvement of the Canal-Aquifer Flow Regime in the C-IN Basin. Resource Planning Department, South Florida Water Management District, West Palm Beach, FL.

2. Beaven, T. R. and Meyer, F.W., 1978. Record of Wells in the Floridan Aquifer in Dade and Monroe Counties, FL. US Geol. Survey Open-File Report 78-881.

3. Dade County Dept. of Environmental Resources Management, 1978a. A Water Quality Assessment of Metropolitan Dade County.

4. Dade County Dept. of Environmental Resources Management, 1978b. Dade County 208 Areawide Water Quality Plan.

5. Garcia-Bengochea, J. I., 1970. Statement to the Federal-State Enforcement Conference to seek ways of Curbing Pollution of the Waters of Dade County, FL. Consultant's Report, Black, Crow and Eidsness, Inc., Gainesville, FL.

6. Hull, J. E., 1978. Summary of Hydrologic Data Collected During 1976 in Dade County, FL. US Geol. Survey Open-File Report 78-883.

7. Hull, J. E., 1982. Hydrologic Conditions in Dade County, FL. 1980. US Geol. Survey Open-File Report. (No Number).

8. Hull, J. E. and Beaven, T. R., 1977. Summary of Hydrologic Data Collected During 1975 in Dade County, FL. US Geol. Survey Open-File Report 77-803.

9. Hull, J. E. and Meyer, F. W., 1973. Salinity Studies in East Glades Agricultural Area, Southeastern Dade County, FL. Florida Bureau of Geol. Report of Investigation, No. 66.

10. Kenner, W. E., 1966. Runoff in Florida. Florida Bureau of Geology Map Series 22.

11. Klein, H., 1976. Simulations of Water-Level Drawdowns in Proposed Well Field Areas, Dade County, FL. US Geol. Survey Open-File Report 76-651.

12. Klein, H. and Hull, J. E., 1978. Biscayne Aquifer, Southeast Florida. US Geol. Survey Water Resources Investigation 78-107.

13. Lane, E., 1981. Environmental Geology Series - Miami Sheet. Florida Bureau of Geology Map Series 101.

14. McKenzie, D. J., 1976. Injection of Acidic Industrial Waste Into the Floridan Aquifer Near Belle Glade, FL: Upward Migration and Geochemical Interact ons 1973-1975. US Geol. Survey Open-File Report 76-626.

15. Meyer, F. W., 1974. Evaluation of Hydraulic Characteristics of a Deep Artesian Aquifer From Natual Water Level Fluctuations, Miami, FL. Florida Bureau of Geology Report of Investigation No. 75.

16. Meyer, F. W., 1974. Availability of Ground Water for the US Navy Well Field Near Florida City, Dade County, FL. US Geol. Survey Open-File Report FL 74014.

17. Parker, G. G., G. E. and Love, S. K., 1955. Water Resources of Southeastern Florida, With Special Reference to the Geology and Ground Water of the Miami Area. US Geol. Survey Water Supply Paper 1255.

18. Schroeder, M. C., Klein, H. and Hoy, N. D., 1958. Biscayne Aquifer of Dade and Broward Counties, Florida. Florida Bureau of Geology Report of Investigation No. 17.

19. Scott, T. M., Hoenstine, R. W., Knapp, M.S., Lane, E., Ogden, G.M., Denerling, R. and Neel, H.E., 1980. The Sand and Gravel Resources of Florida. Florida Bureau of Geology Report of Investigation No. 90.

20. Smith, C. A., Lidz, L. and Meyer, F. W., 1982. Data on Selected Deep Wells in South Florida. US Geol. Survey Open-File Report 82-348.

21. South Florida Water Management District, 1978. Water Use and Supply Development Plan.

22. U.S. Department of Agriculture, Soil Conservation Service, 1958. Soil Survey of Dade County, Florida.

23. White, W. A., 1970. The Geomorphology of the Florida Penninsula. Florida Bureau of Geology Geological Bulletin No. 51.

24. Yoder, D., 1982. The Biscayne Aquifer Project: Local Well Field Protection Program. Program Abstracts for Sixth National Ground-Water Quality Symposium, Atlanta, September 22-24.

APPENDIX J

GLOSSARY OF TERMINOLOGY AND ABBREVIATIONS

APPENDIX J

GLOSSARY OF TERMINOLOGY AND ABBREVIATIONS

ACFT MAINT: Aircraft Maintenance

AF: Air Force

AFB: Air Force Base

AFCC: Air Force Communication Command

AFCS: Air Force Communications Service

AFESC: Air Force Engineering and Services Center

AFFF: Aqueous Film Forming Foam, a fire extinguishing agent

AFR: Air Force Regulation

AFRES: Air Force Reserve

AFS: Air Force Station

AFSC: Air Force Systems Command

Ag: Chemical symbol for silver

AGS: Aircraft Generation Squadron

Al: Chemical symbol for aluminum

AQUICLUDE: Poorly permeable formation that impedes ground-water movement and does not yield to a well or spring

AQUIFER: a geologic formation, group of formations, or part of a formation that is capable of yielding water to a well or spring

AQUITARD: A geologic unit which impedes ground-water flow

ARRS: Aerospace Rescue and Recovery Squadron

ARTESIAN: Ground water contained under hydrostatic pressure

ATC: Air Training Command

AVGAS: Aviation Gasoline

AVLUB: Aviation Lubricant

Ba: Chemical symbol for ' 'rium

BES: Bioenvironmental Engi'...ring Services

BIOACCUMULATE: Tendency of elements or compounds to accumulate or build up in the tissues of living organisms when they are exposed to these elements in their environments, e.g., heavy metals

BOWSER: A portable tank, usually under 200 gallons in capacity

BX: Base Exchange

CAMS: Consolidated Aircraft Maintenance Squadron

Cd: Chemical symbol for cadmium

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act

CES: Civil Engineering Squadron

CIRCA: About; used to indicate an approximate date

Class B Water: Water suitable for secondary contact as in recreation, as a source for drinking water supply after conventional treatment for fishing, for survival and propogation of fish and other flora and fauna, and for industrial and agricultural use.

CLOSURE: The completion of a set of rigidly defined functions for a hazardous waste facility no longer in operation

CN: Chemical symbol for cyanide

COASTAL PLAINS: Physiographic province of the Eastern United States characterized by a gently seaward sloping surface formed over exposed, unconsolidated, stratified marine fluvial sediments. Typical coastal plain features include low hills and ridges, organic deposits, floodplains and high water tables

COD: Chemical Oxygen Demand, a measure of the amount of oxygen required to oxidize organic and oxidizable inorganic compounds in water

COE: Corps of Engineers

CONFINED AQUIFER: An aquifer bounded above and below by impermeable strata or by geologic units of distinctly lower permeability than that of the aquifer itself

CONTAMINATION: The degradation of natural water quality to the extent that its usefulness is impaired; there is no implication of any specific limits since the degree of permissible contamination depends upon the intended end use or uses of the water

COQUINA - A porous limestone formed by cemented marine shell fragments.

Cr: Chemical symbol for chromium

CRS: Component Repair Squadron

CSG: Combat Support Group

Cu: Chemical symbol for copper

DERM: Department of Environmental Resource Management

DET: Detachment

DISPOSAL FACILITY: A facility or part of a facility at which hazardous waste is intentionally placed into or on land or water, and at which waste will remain after closure

DISPOSAL OF HAZARDOUS WASTE: The discharge, deposit, injection, dumping, spilling, or placing of any hazardous waste into or on land or water so that such waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground water

DISTAL: Farthest from the center or point of origin; the most distant

DOD: Department of Defense

DOWNGRADIENT: In the direction of lower hydraulic static head; the direction in which ground water typically flows

DPDO: Defense Property Disposal Office, formerly Redistribution and Marketing

DUMP: An uncovered land disposal site where solid and/or liquid wastes are deposited with little or no regard for pollution control or aesthetics; dumps are susceptible to open burning and are exposed to the elements, disease, vectors and scavengers

EFFLUENT: A liquid waste discharge from a manufacturing or treatment process, in its natural state, or partially or completely treated, that discharges into the environment

EMS: Equipment Maintenance Squadron

ENT: Ear, Nose and Throat, an area of medical specialization

EOD: Explosive Ordnance Disposal

EP: Extraction procedure, the EPA's standard laboratory procedure for leachate generation

EPA: Environmental Protection Agency

EPHEMERAL AQUIFER: A water-bearing zone typically located near the surface which normally contains water seasonally

EROSION: The wearing away of land surface by wind, water or chemical processes

FAA: Federal Aviation Administration

FACILITY: Any land and appurtenances thereon and thereto used for the treatment, storage and/or disposal of hazardous wastes

FDER: Florida Department of Environmental Regulation

Fe: Chemical symbol for iron

FLOOD PLAIN: The lowland and relatively flat areas adjoining inland and coastal areas of the mainland and off-shore islands, including, at a minimum, areas subject to a one percent or greater chance of flooding in any given year

FLOW PATH: The direction or movement of ground water as governed principally by the hydraulic gradient

FPTA: Fire Protection Training Area

GC/MS: Gas chromatograph/mass spectrophotometer, a laboratory procedure for identifying unknown compounds

GROUND WATER: Water beneath the land surface in the saturated zone that is under atmospheric or artesian pressure

GROUND-WATER RESERVOIR: The earth materials and the intervening open spaces that contain ground water

HARDFILL: Disposal sites receiving construction debris, wood, miscellaneous spoil material

HARM: Hazardous Assessment Rating Methodology

HAZARDOUS SUBSTANCE: Under CERCLA, the definition of hazardous substance includes:

1. All substances regulated under Paragraphs 311 and 307 of the Clean Water Act (except oil);

2. All substances regulated under Paragraph 3001 of the Solid Waste Disposal Act;

3. All substances regulated under Paragraph 112 of the Clean Air Act;

4. All substances which the Administrator of EPA has acted against under Paragraph 7 of the Toxic Substances Control Act;

5. Additional substances designated under Paragraph 102 of the Superfund bill.

HAZARDOUS WASTE: A solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical or infectious characteristics may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or

incapacitating reversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed (RCRA)

HAZARDOUS WASTE GENERATION: The act or process of producing a hazardous waste (see above)

HEAVY METALS: Metallic elements, including the transition series, which include many elements required for plant and animal nutrition in trace concentrations but which become toxic at higher concentrations

Hg: Chemical symbol for mercury

HQ: Headquarters
HWMF: Hazardous Waste Management Facility

INCOMPATIBLE WASTE: A waste unsuitable for commingling with another waste or material because the commingling might result in generation of extreme heat or pressure, explosion or violent reaction, fire, formation of substances which are shock sensitive, friction sensitive, or otherwise have the potential for reacting violently, formation of toxic dusts, mists, fumes, and gases, volatilization of ignitable or toxic chemicals due to heat generation in such a manner that the likelihood of contamination of ground water or escape of the substance into the environment is increased, any other reaction which might result in not meeting the air, human health, and environmental standards.

INFILTRATION: The movement of water through the soil surface into the ground

IRP: Installation Restoration Program

ISOCHLOR: Line of equal chloride concentration

ISOPACH: Graphic presentation of geologic data, including lines of equal unit thickness that may be based on confirmed (drill hole) data or indirect geophysical measurement.

JP-4: Jet Propulsion Fuel Number Four, military jet fuel

JP-5: Jet Propulsion Fuel Number Five, commercial jet fuel

LEACHATE: A solution resulting from the separation or dissolving of soluble or particulate constituents from solid waste or other man-placed medium by percolation of water

LEACHING: The process by which soluble materials in the soil, such as nutrients, pesticide chemicals or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water

LINER: A continuous layer of natural or man-made materials beneath or on the sides of a surface impoundment, landfill, or landfill cell which

restricts the downward or lateral escape of hazardous waste, hazardous waste constituents or leachate

LOX: Liquid oxygen

LYSIMETER: A vacuum operated sampling device used for extracting pore water samples at various depths within the unsaturated zone

MAC: Military Airlift Command

MARL - A calcareous clay; a mixture of clay and calcite, dolomite or marine shell fragments.

MEK: Methyl Ethyl Ketone

MGD: Million gallons per day

MOGAS: Motor gasoline

Mn: Chemical symbol for manganese

MONITORING WELL: A well used to measure ground-water levels and to obtain water-quality samples

MSL: Mean Sea Level

NCO: Non-commissioned Officer

NCOIC: Non-commissioned Officer In-Charge

NDI: Non-destructive inspection

Ni: Chemical symbol for nickel

NPDES: National Pollutant Discharge Elimination System

OEHL: Occupational and Environmental Health Laboratory

OIC: Officer in Charge

Oölite - Geological term for a spherical or ellipsoidal body 0.25 to 2.0 mm in diameter, with or without a nucleus, normally formed in calcareous rock deposited in a wave-agitated medium.

ORGANIC: Being, containing or relating to carbon compounds, especially in which hydrogen is attached to carbon

OSI: Office of Special Investigations

O&G: Symbols for oil and grease

Pb: Chemical symbol for lead

PCB: Polychlorinated Biphenyl; liquids used as dielectrics in electrical equipment

PERCOLATION: Movement of moisture by gravity or hydrostatic pressure through interstices of unsaturated rock or soil

PERMEABILITY: The capacity of a porous rock, soil or sediment for transmitting a fluid without damage to the structure of the medium

PD-680: Cleaning solvent

pH: Negative logarithm of hydrogen ion concentration, a measure of acidity.

PL: Public Law

POL: Petroleum, Oils and Lubricants

POLLUTANT: Any introduced gas, liquid or solid that makes a resource unfit for a specific purpose

PPB: Parts per billion by weight

PPM: Parts per million by weight

RCRA: Resource Conservation and Recovery Act

RECHARGE AREA: A surface area in which surface water or precipitation percolates through the unsaturated zone and eventually reaches the zone of saturation. Recharge areas may be natural or manmade

RECHARGE: The addition of water to the ground-water system by natural or artificial processes

SAC: Strategic Air Command

SANITARY LANDFILL: A land disposal site using an engineered method of disposing solid wastes on land in a way that minimizes environmental hazards

SATURATED ZONE: That part of the earth's crust in which all voids are filled with water

SCS: U.S. Department of Agriculture Soil Conservation Service

SLUDGE: Any garbage, refuse, or sludge from a waste treatment plant, water supply treatment, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, or agricultural operations and from community activities, but does not include solid or dissolved materials in domestic sewage; solid or dissolved materials in irrigation return flows; industrial discharges which are point source subject to permits under Section 402 of the Federal Water Pollution Control Act, as amended (86 USC 880); or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954 (68 USC 923)

SPILL: Any unplanned release or discharge of a hazardous waste onto or into the air, land, or water

STORAGE OF HAZARDOUS WASTE: Containment, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazardous waste

STP: Sewage Treatment Plant

TAC: Tactical Air Command

TCE: Trichloroethylene

TCS: Tactical Control Squadron

TFW: Tactical Fighter Wing

TOXICITY: The ability of a material to produce injury or disease upon exposure, ingestion, inhalation, or assimilation by a living organism

TRANSMISSIVITY: The rate at which water is transmitted through a unit width of aquifer under a unit hydraulic gradient

TRANS: Transportation Squadron

TREATMENT OF HAZARDOUS WASTE: Any method, technique, or process including neutralization designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize the waste or so as to render the waste nonhazardous

TSD: Treatment, storage or disposal

TTW: Tactical Training Wing

UPGRADIENT: In the direction of increasing hydraulic static head; the direction opposite to the prevailing flow of ground water

USA: United States Army

USAF: United States Air Force

USAFSS: United States Air Force Security Service

USGS: United States Geological Survey

USMC: United States Marine Corps

USN: United States Navy

WATER TABLE: Surface of a body of unconfined ground water at which the pressure is equal to that of the atmosphere

Zn: Chemical symbol for zinc

APPENDIX K

INDEX OF SITES OF POTENTIAL ENVIRONMENTAL CONTAMINATION

APPENDIX K
INDEX OF SITES OF POTENTIAL ENVIRONMENTAL CONTAMINATION